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ABSTRACT

This first catalog of computer education projects sponsored by the U.S. Department of Education presents summaries of 275 computer education projects, each of which includes an abstract and information on target audience, award amount, major products, project director, and Department of Education contact person. An introductory overview summarizes Department of Education activities by general type of activity; computer education projects by intended specific user population; extent of courseware/software development; and department offices. A departmental organization chart is included. Project descriptions are organized into five categories, beginning with projects focusing on development of students' computer literacy at the elementary and secondary levels, at the adult and postsecondary levels, and among computer science students and faculty. Projects related to computers as instructional aids for students include those concerned with computers as basic communication aids for the disabled and computers as learning aids in specific content areas. The third category covers projects involving computers for educators, either helping educators to use computers or using computers for educational management. Research and evaluation projects summarized are concerned with computer use, evaluation of computer courseware and computer education activities, using the computer for basic research on learning, and using computers to retrieve or process research and development information. Multipurpose computer education projects are described in the final section. (LMM)

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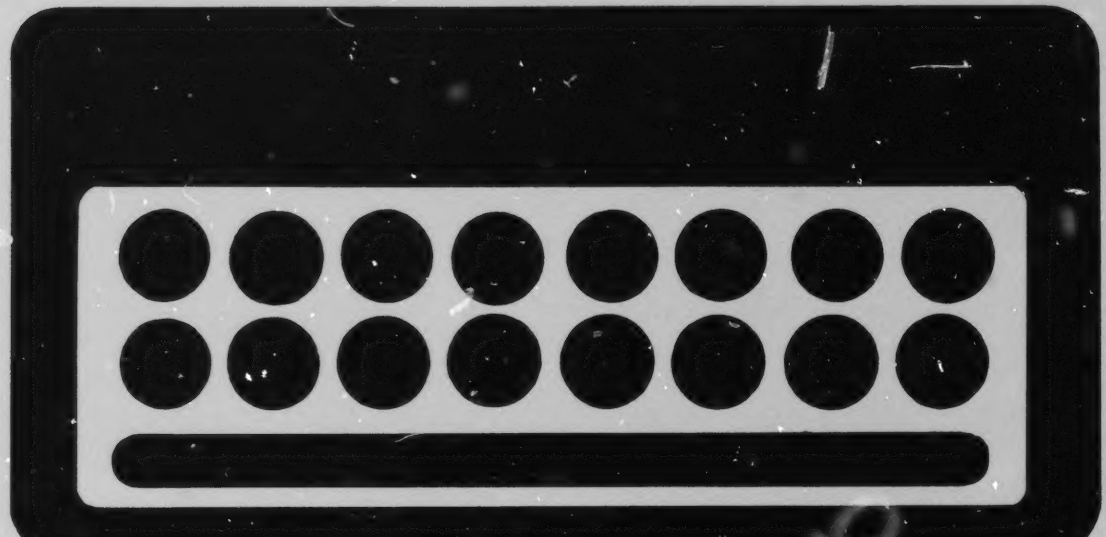
# COMPUTER EDUCATION:

## A CATALOG OF PROJECTS SPONSORED BY THE U.S. DEPARTMENT OF EDUCATION, 1983



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The National Institute of Education
NIE

# COMPUTER EDUCATION: A CATALOG OF PROJECTS

## SPONSORED BY THE U.S. DEPARTMENT OF EDUCATION, 1983

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April 1984

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ACKNOWLEDGEMENTS--Many staff in the U.S. Department of Education have contributed to the development of this Catalog. It was designed and developed by the Computer Catalog Work Group of Kathleen Fulton, Educational Technology and Science, OERI; Jean Narayanan, Libraries and Learning Technology, OERI; Patricia Butler, Teaching and Learning, NIE; and Edward Fuentes, formerly with Teaching and Learning, NIE. Shirley Jackson, former Associate Director of Teaching and Learning, Jeff Schiller, Acting Associate Director of Teaching and Learning, Charles Stalford, Acting Assistant Director of Testing, Assessment and Evaluation, and Enid Herndon, Evaluation Team Leader, have also facilitated this project. Joseph Wilkes and Cora Corry of Testing, Assessment and Evaluation have contributed to the funding analyses, development of indexes, and dissemination activities and Terry Pratt and Karen Scott have typed the Catalog on the word processor. Mary A. Campbell of NIE's Educational Reference Center provided information from ERIC computer searches. Gary Grassl, from the Department's Office of Legislation and Public Affairs copy edited the catalog, and with his colleague Larry Olds provided design suggestions. James Newman, Graphics Production Branch in the Office of Management designed the cover. Many thanks are also in hand for each of the Education Department Contact people whose names are listed on the invididual abstracts and for some of their predecessors who are no longer in the Department of Education and for many others who helped identify projects and supported this work.

Susan S. Klein, Editor

PROHIBITED--No person in the United States shall, on the basis of race, color, national origin, disability, sex and age be prohibited from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.

# PREFACE

We are pleased to share with you this first Catalog of computer education projects sponsored by the U.S. Department of Education. It is intended to help you learn of the ways the Department is providing leadership and support to educators who are joining the computer revolution. This Catalog contains an overview of the general types of projects which were ongoing during 1983 and 275 project summaries with names and addresses of people to contact for more information.

This Catalog should serve as a valuable aid in the following ways:

- It will save you time, effort and resources by providing you with leads to individuals -- perhaps even in your own State -- you may want to contact to learn about their computer education experiences.

- This Catalog will help you understand the Department's wide range of interests in computers and education including the development of computer hardware and software, teacher training, research, demonstration and dissemination activities. Often the Education Department contact persons listed on each project abstract will be able to inform you of new activities planned by their respective offices.

- Finally, the Catalog should serve as a diagnostic tool to identify what still needs to be done to make the most of computers in education and to avoid reinventing solutions. For example, to date we've found only one Department of Education sponsored software development project in the critical area of foreign language instruction.

If this Catalog whets your appetite for more information about Federally and non-Federally sponsored work dealing with computers and education, I'd like to invite you to query the Department of Education, National Institute of Education sponsored ERIC system. ERIC, a computerized information retrieval system, already contains about 18,000 document citations dealing with computers and education, including many print products referenced in these abstracts.

Since we plan to update this Catalog of computer education projects annually, feel free to write the editor at the National Institute of Education with your ideas on how to make future editions more useful to you.

Manuel J. Justiz, Director
National Institute of Education

May 1984

# CONTENTS

Page

PREFACE .......... iii

OVERVIEW .......... vii

Summary of Department of Education Activities by Type of Activity .......... viii

Summary of Computer Education Projects by Intended Specific User Population .......... xiii

Summary of Computer Education Projects by Extent of Courseware/Software Development .......... xiii

Summary of Computer Education Projects by Department of Education Offices .......... xiv

U.S. Department of Education Organizational Chart .......... xvi

PROJECT ABSTRACTS ..........

I. DEVELOPING STUDENTS' COMPUTER LITERACY .......... 1

A. Elementary and Secondary Levels .......... 3

B. Adult and Postsecondary Levels .......... 17

C. Computer Science Students and Faculty .......... 26

II. COMPUTERS AS INSTRUCTIONAL AIDS FOR STUDENTS .......... 33

A. Computers as Basic Communication Aids for the Disabled .......... 33

1. Visually impaired .......... 34
2. Non-vocal .......... 37
3. Severely physically impaired .......... 40
4. Multiply handicapped .......... 43

B. Computers as Learning Aids .......... 48

1. Multiple Content Areas .......... 48
2. Basic Skills .......... 63
3. English Language Arts .......... 73
4. Foreign Languages .......... 99
5. Math .......... 100
6. Math/Science .......... 118
7. Science .......... 122
8. Social Science .......... 135
9. Fine Arts .......... 140
10. Business/Technical Education .......... 141
11. Student Counseling .......... 143

## CONTENTS (Continued)

Page

III. COMPUTERS FOR EDUCATORS .......... 145

A. Helping Educators Use Computers .......... 145

1. Educator Training .......... 147
2. Technical Assistance .......... 165
3. Developing Authoring Systems .......... 174

B. Using Computers for Educational Management .......... 179

1. Computers for Testing .......... 179
2. Instructional Management of Student Related Information .......... 181
3. Institutional Management .......... 195
4. District and State Level Decision Making .......... 197

IV. RESEARCH AND EVALUATION .......... 209

A. Research on Computer Use .......... 209

1. Research on General Computer Use .......... 210
2. Research on Classroom Use of Computers .......... 222
3. Research on Computer Use Within Specific Populations .......... 229

B. Evaluation of Computer Courseware and Computer Education Activities .......... 243

1. Assessment of Computer Education Courseware .......... 243
2. Evaluations of Computer Education Activities .......... 251

C. Using Computers for Basic Research on Learning .......... 257

D. Using Computers to Retrieve or Process R&D Information .......... 266

V. MULTI-PURPOSE COMPUTER EDUCATION PROJECTS .......... 273

INDICES .......... 289

Project Director .......... 291

Sponsoring Office in the Department of Education .......... 297

# OVERVIEW

The U.S. Department of Education's support for computers in education has come in many forms ranging from research and development of computer software to educator training programs. During the past few years, the amount of Department of Education activities devoted to this topic has been substantial. However, the exact amount and nature of the Department's funding support are hard to tally since much of the Department's funding goes to States via block grants. Recent reports by the American Association for School Administrators and a Department of Education sponsored study (described on page 217 of the Catalog) suggest that a substantial percent of Chapter 1 and 2 Education Consolidation and Improvement Act block grant funds are used to purchase computer equipment, software or to support computer education activities in schools. Even more of the total funds for computer related expenditures come from local and State contributions than from Federal contributions.

The development of this Catalog has enabled us to learn about the varied and wide range of winners of many competitions for federal grants and contracts designed to accomplish specific purposes, i.e. discretionary categorical funding. A 1981 Department of Education estimate suggests that the Department spent slightly over $20 million during each fiscal year from 1980-1982 on discretionary computer education projects. A rough tabulation of the Department's project funding awards in this Catalog suggests that approximately $38 million was spent on discretionary computer education projects during 1983. The projects in this Catalog represent close to a $77 million federal investment if the many multiple year funding awards for each project are totaled. It is in these R&D, evaluation, dissemination and technical assistance projects that the Department is taking a leadership role in actively helping the local schools make the most of their computer education purchases.

This Catalog contains 275 abstracts (summaries) of Department of Education discretionary computer education projects that have been active any time during 1983. Secretary Bell invited all his Assistant Secretaries to provide us with abstracts, and we know that there are even more ongoing projects than what we have been able to include in this Catalog. In some cases there were so many projects that the program officers in the Department provided us only with representative samples. In another case we received the abstracts too late to incorporate into this version of the Catalog. However, we anticipate that coverage will become more complete in the proposed annual updates of this Catalog.

As you may note by examining the table of contents, we have organized the abstracts according to the major purposes of the computer education projects as they cut across the entire Department of Education. Part I "Developing Students' Computer Literacy and Computer Skills" contains 11% of the Catalog's abstracts. These projects are intended to help students learn about computers and to use them as tools for programming, word processing, etc. Computer science courses for college students and faculty are also included in this section. Part II "Computers as Instructional Aids for Students" contains 40% of the Catalog abstracts. It is divided into a group of 14 equipment-oriented projects which support the development of communication devices for the disabled and 96 projects which are designed to help students learn content ranging from basic skills to music theory. Part III "Computers for Educators" contains 22% of the projects, ranging from training teachers to use computers to help their students learn, to providing administrators with computer based information management systems. Part IV "Research and Evaluation" contains another 22% of the projects. Finally, Part V contains "Multi-purpose Computer Education Projects" which covers topics included in at least three of the previous sections.

As for any category system of complex items, many projects could easily fit under multiple headings, but for this Catalog we have assigned each project abstract one place only. In selecting that niche, we have tried to look for the project's major thrust and for its most unique aspect. Thus, when a project using a teacher training strategy was primarily intended for Adult Basic Education students and their teachers, we put it in Part II "Computers as Instructional Aids for Students" rather than in Part III A "Helping Educators Use Computers." Similarly, when a project was designed to evaluate the computer software available for foreign language instruction, we included that project in Part IV on "Research and Evaluation" rather than in Part II on "Computers as Instructional Aids for Students".

The following sections of this overview will summarize the types of projects that we found in each section, briefly describe the relative emphases of the major program offices in the Department, and report on the distribution of computer education projects with respect to how they are targeted at specific populations, such as the economically disadvantaged, rural, minority, female, disabled, and gifted. We will also comment on the general extent of computer courseware/software developed through the projects.

## SUMMARY OF DEPARTMENT OF EDUCATION DISCRETIONARY COMPUTER EDUCATION PROJECTS BY TYPE OF ACTIVITY

It is interesting to note that over half the projects described in this Catalog focus on students directly, either by helping them become computer literate or by using computers to learn subject content such as mathematics or history. Most of the remaining projects focus on helping educators use computers to improve education or to support research and evaluation on computers in education. The number of projects in Part IV "Research and Evaluation" would be much higher if many of the projects in previous sections, which supported research and evaluation activities to some extent, were double counted.

## I. DEVELOPING STUDENTS' COMPUTER LITERACY

Computer literacy activities typically help students learn about computers and skills which will help them operate computers for a wide variety of applications from word processing to retrieving information from data banks. There is limited agreement about what people mean by computer literacy and the extent to which such literacy of current computer technology will be appropriate and valuable to students in the future. (A study by Marlaine Lockheed on this topic is described on page 214.)

Part I of the Catalog contains 29 projects whose major purpose is to help elementary, secondary, adult and postsecondary students learn about computers. Some of the Part II projects designed to use computers to teach students other content also have computer literacy components. The computer education project abstracts in Part I are organized by the age of the students. They range from a program to teach LOGO to kindergarten to third grade children, to a project to help women office workers enter the word processing and professional computer fields, to six postsecondary computer science projects. Since computer literacy has received so much public attention, it is somewhat surprising to find that only 10% of the projects in the Catalog are in the computer literacy section and that they represent less than $3 million or only 7% of the Department of Education annual $38 million investment of discretionary funds for computer education projects. It is also interesting to note that only six of these 29 projects are intended for high school students although the National Commission on Excellence in Education recommended a half year of high school computer science. However, many of the projects described in Part II "Computers as Instructional Aids for Students" and Part III "Computers for Educators" include computer literacy components. For example, an additional 18 projects in Part III A are designed specifically to help educators acquire knowledge about computers and their use as instructional tools.

## II. COMPUTERS AS INSTRUCTIONAL AIDS FOR STUDENTS

### A. Computers as Basic Communication Aids for the Disabled.

While most projects use computers to help teach students various subjects, the Department of Education also supported 14 projects at about $2 million annually which help students with their basic communications at a more rudimentary level. These technologically sophisticated equipment development projects will help disabled students surmount barriers to learning by developing speech synthesizers and speech recognizers, portable computers for note-taking for vision impaired students, and adaptive interface units for severely physically impaired persons who can't use the regular computer keyboard. In the Catalog, these projects are organized by primary impairment, starting with those for visually impaired and going on to those for the multiply handicapped.

### B. Computers as Learning Aids

The section on content-focused, computer assisted instruction projects contains 96 abstracts, which are subdivided into 11 content areas. Most, (25) are developing or studying computer based instruction for English language arts activities such as reading, writing, speaking, listening or spelling. Eight of these are intended specifically for bilingual, limited English proficient students and five for handicapped students. Mathematics is the second largest category. The 18 mathematics projects range from math games for students in grades 1-4 to graphing skills for adult algebra and trigonometry students. Ten projects attend to a combination of basic skills areas, usually mathematics and English language arts; half of these are adult basic education projects. There are also 13 diverse science projects and four combined mathematics and science projects. Another sizeable cluster of 15 are intended to help students learn content in multiple areas ranging from English as a Second Language, to study skills, and philosophy. There are very few projects in social sciences, business and technical content areas and only one each for foreign language instruction (a French composition course) or for fine arts (a music theory course). As in Part I, the abstracts within subject area categories are organized with those for the youngest children first. These 96 projects total about $8 million or 26% of the annual expenditures in the Catalog.

## III. COMPUTERS FOR EDUCATORS

About $17 million or 45% of the total annual Department of Education funds for projects in this Catalog are represented by abstracts in Part III. This Part is divided into two sections. The first section contains training and other projects designed to specifically help educators use computers. The second section contains projects that deal with the uses of computers for educational management. Part V "Multipurpose Computer Education Projects" also has a major focus on the role of educators in using computers.

### A. Helping Educators Use Computers

The 32 projects in this section are designed to help teachers learn about computers and their uses with students. The first group contains abstracts of educator training projects. Five general educator training projects include inservice courses to help elementary and secondary teachers use computers in their instruction, similar courses for preservice teachers, and courses for employees in the U.S. Department of Education. These general educator training projects are followed by eight training courses for special education teachers and administrators and one for school nurses who assist handicapped students in regular public schools. The training group concludes with five projects for adult basic education teachers. Other projects which involved substantial amounts of teacher training are located in parts of the Catalog which were specifically related to what the teachers were learning, for example, projects which help faculty learn about computer science are located in Part I "Developing Students' Computer Literacy".

There are nine projects which provide technical assistance to help educators implement computer activities. Some have produced publications which advise educators. Other projects provide teachers and administrators with computer education experts or information systems, and many projects use a combination of these strategies to address the needs of parents and educators. Abstracts of these technical assistance projects are organized according to whether they are targeting their assistance at the local, State or national level.

There are also five projects which help educators learn to develop instructional courseware for students. Most focus on educators working with handicapped students and involve the development of authoring systems to help teachers develop computer assisted instructional materials for their students.

### B. Using Computers for Education Management

There are 28 projects which take advantage of computers to assist educators with the management of information about the instructional needs and achievements of students. Two deal with using computers for testing students. Fourteen focus on the more general needs of managing student related information. Although most of these management systems are generally applicable for all levels of students, the abstracts in this section are arranged so that those dealing with instructional management systems for younger students come before those designed for adult learners.

Two projects attend to using computers for institutional management activities such as computerized payroll or an electronic mail system. The remaining ten projects in this section are designed to help local school districts or States use computers to make decisions about instructional materials, instructional practices, instructional accomplishments, goals, staffing and financing. The Federal financial support for this section exceeded $11 million in 1983 because it included the support of two large student information management services, the Migrant Student Record Transfers System, and the four Chapter I Evaluation Technical Assistant Centers. Both activities receive about $5 million annually. In the course of our investigation we also learned of two inhouse Department of Education activities to use computers to manage information. They are the use of computers to provide on-line queries for users of National Assessment of Educational Progress (NAEP) information in the National Institute of Education and a similar query system for student financial aid program information in the Office of Postsecondary Education.

## IV. RESEARCH AND EVALUATION

Part IV "Research and Evaluation" like Part III "Computers for Educators" contains 22% of our total Catalog abstracts but only represents an $8 million annual investment rather than Part III's $11 million. Part IV projects are concerned with research and evaluation activities related to computers and education. It should be noted, however, that most of the projects in the preceding parts also used research and/or evaluation strategies at least to some extent to accomplish their project goals.

### A. Research on Computer Use

Thirty-two of the 61 projects in this part of the Catalog are designed to help educators learn about the use of computers in our educational systems. These 32 research projects have been divided into three sections. The first set examines international, national and State level patterns and issues related to the use of computers in education. Two of these 12 projects focus on mathematics and science. One of these, the National Educational Technology Center, is the largest research project described in the Catalog. The seven projects in the second group examine computer use at the classroom or school level. They are organized chronologically by age of student group studied. The third set of research projects attend to computer use issues within specific populations. Nine in this group attend to unique needs of handicapped students, three to vocational education, one to the needs of large city school districts, and one to the needs of rural educators/students.

### B. Evaluation of Computer Courseware and Computer Education Activities

There are eight projects specifically designed to assess computer education courseware to help educators select computer education materials wisely. One, MicroSIFT, provides a general information system, and others provide specific information on computer materials in content areas ranging from foreign language instruction to vocational education. Many of the educator training and technical assistance projects described in Part III "Computers for Educators" also assist in providing evaluative information on courseware, and some use the Educational Products Information Exchange (EPIE) appraisal system.

Six other evaluation projects are designed to help education policy makers determine when to use computers or other educational strategies, or to examine the value of specific computer education approaches, such as interactive videodiscs or the effectiveness of authoring languages for special educators. Two evaluations of the effectiveness of computer assisted instruction focus on adult basic skills.

### C. Using Computers for Basic Research on Learning

In this Catalog, we have excluded the many research projects which used computers for data analysis or those that use computers for word processing or other routine computer operations without direct educational purposes. However, we have included nine abstracts of basic research projects which used the computer in unique ways to learn about teaching and learning. They range from a clinical neuropsychology project using computer aided reading training with learning disabled students to the development of a computer program for investigating social processes in small groups, to an examination of the demands and cognitive consequences of learning computer programming. As in many other sections, these abstracts are organized according to the chronological age of the students being studied, with those that cover a wide range of ages at the end.

### D. Using Computers to Retrieve or Process R&D Information

The Department of Education sponsors a wide variety of projects and Clearinghouses which use computers to retrieve or organize R&D information. However, only seven of these have been abstracted for this Catalog. They include the Educational Resources Information Center (ERIC) Clearinghouse on Information Resources which has the most direct responsibility for information on computers of any of the 16 ERIC Clearinghouses. From 1980 to the end of 1983, the ERIC system entered over 4,500 document citations dealing with computers and education, but only 203 of these were sponsored by the Department of Education or its predecessor. Of the other six information retrieval projects in this section, one provides a national database on information technology in education, another on postsecondary innovations, and two are designed for adult users in rural areas.

## V. MULTI-PURPOSE COMPUTER EDUCATION PROJECTS

The Department also sponsors 13 user oriented projects that could fit into at least three of our Catalog sections simultaneously. Many of these multipurpose projects use computers as instructional aids for students and also provide multiple services to help educators use computers. All but two have a demonstration focus. Ten National Diffusion Network "Lighthouse Projects" arranged in alphabetical order by title, precede the remaining three multipurpose projects in this section.

## SUMMARY OF COMPUTER EDUCATION PROJECTS BY INTENDED SPECIFIC USER POPULATION

Over one third of the 275 abstracts of projects in the Catalog mention attending to target audiences such as minority, female, rural, economically disadvantaged, handicapped, or gifted students with special needs for equitable educational opportunities. However, in many of these abstracts, these equity target groups are just one of many populations listed. Thus, far fewer than one third of the projects are primarily devoted to the needs of any of these target groups in need of special equitable treatment.

Sixty, or over half of all of these projects which mention these equity target populations, are intended to help handicapped students and their teachers. The abstracts for 24 projects mention attending to minority or culturally diverse students, 16 focus on rural populations, and 12 on the needs of girls or women. A major proportion of the projects for minority students are for students who need to learn English as a second language. Only seven project abstracts mention special attention to gifted students, and only eight to populations of economically disadvantaged students despite the fact that some of these projects are supported by Chapter I funds or by Title III of the Higher Education Act, both of which serve predominantly economically disadvantaged populations. Many of these equity oriented projects attend to the needs of multiple special populations, such as women of all races and minority males within the same project.

Most of the projects for girls and women are in Part I, on computer literacy; a few are in Part II, to help girls use computers as instructional aids for learning mathematics and science. The projects for handicapped students are well represented in all sections except for the computer literacy section where there are none. Among the above target populations, most projects to use the computer as an aid for instructing students in basic and other skills are targeted to special education and English as a second language learners. Special educators are the recipients of the preponderance (20 out of 26) of the educator training projects. These projects help educators use computers to instruct their students or for other general educational management purposes. Several of the projects for rural populations involve using the computer to help them network.

## SUMMARY OF PROJECTS BY EXTENT OF COURSEWARE/SOFTWARE DEVELOPMENT

Approximately 97 of the projects appear to be developing at least one component which will include software in a form that might be used by individuals beyond the project participants; however, most are doing other things as well. As might be expected, most (56) of the major courseware development projects are in Category II B, "Computers as Learning Aids for Students" and most of these are for English language arts, mathematics, and science instruction. Another cluster (13) of software producing projects is in Category III B "Using Computers for Educational Management". Eleven of the 97 projects are primarily adapting software for their needs. Others are conducting research on, or evaluations of, courseware. More still are using existing courseware/software in their various project activities.

## SUMMARY OF COMPUTER EDUCATION PROJECTS BY DEPARTMENT OF EDUCATION OFFICES

It is perhaps not surprising that the Office of Educational Research and Improvement (OERI), with 115 project abstracts and the Office of Special Education and Rehabilitative Services (OSERS), with 56 project abstracts, are the two largest multi-year funders of the $77 million worth of computer education projects within the Department of Education. Together at $25 million and $23 million respectively, they accounted for 62% of the Department of Education discretionary support for computer education projects in the Catalog. If 28 additional projects from the Rehabilitative Services Administration in OSERS which arrived too late to include in this Catalog were added, however, the total multi-year funds for computer education projects in the Office of Special Education and Rehabilitative Services would exceed the amount spent by the Office of Educational Research and Improvement. It is also possible that the apparent heavy involvement of the Office of Educational Research and Improvement in computers and education reflected in this Catalog is somewhat inflated compared to other offices primarily because this Catalog effort was initiated in OERI.

Within the Office of Educational Research and Improvement, 66 of the projects were for research, development and evaluation (R,D and E) activities sponsored by the National Institute of Education. The combined multi-year funding for the NIE projects was over $15 million. Next in line by total funding is the OERI Technology Research Assessment and Development program with 17 projects and close to an $8 million investment. This program supported major software development projects such as TABS, Quill and IRIS (pages 53, 81 and 82). The Division of National Dissemination Programs supported 25 demonstration and technical assistance projects focusing on using computers and totalling $1.5 million. Another component of OERI, the Education Technology and Science staff, monitors four computer projects and coordinates the Secretary's Technology Initiative as well as the Federal Interagency Committee on Technology from whom we received assistance. Three other projects were supported by the OERI, National Center for Education Statistics.

The Office of Special Education and Rehabilitative Services has a substantial history of sponsoring work with computers to help individuals with unique needs. This Catalog contains 45 projects from its Office of Special Education Programs totalling about $13 million and 11 projects from the National Institute of Handicapped Research totalling about $10 million in multi-year funds. The additional 28 projects from the Rehabilitation Services Administration which arrived too late to include in the Catalog provide over $3 million worth of services to handicapped individuals of working age and/or their counselors, educators or program administrators. Most of the projects from OSERS are in Parts II, III, and IV respectively of this Catalog.

The third highest concentration of computer education projects in the Department of Education is found in the Office of Postsecondary Education (OPE). Multi-year funding for the 42 OPE computer education projects totalled $9 million. Most of these 24 projects totalling $5 million, are supported by the Fund for the Improvement of Postsecondary Education. The other 18 are a representative sample of computer education related activities supported by the Division of Institutional Development which implements Title III of the Higher Education Act. Most of these Office of Postsecondary Education Projects are in Parts I, II, and III of the Catalog.

The Office of Bilingual Education and Minority Language Affairs (OBEMLA) is represented by 14 projects totalling $7 million in multi-year funds. Most of these projects are in Part II and most of these are designed to develop ways to use computers to teach English language skills to students with Limited English Proficiency.

The Office of Elementary and Secondary Education (OESE) is represented by 11 discretionary projects totalling about $6 million, but readers should remember that many more of the OESE resources are being spent on computers, computer software and computer activities through OESE administered block grants from Chapters 1 and 2 of the Education Consolidation and Improvement Act. Also, it should be noted that about $5 million of the OESE total supports the Migrant Student Records Transfer System and that four additional compensatory education projects were counted as National Dissemination Division projects in the Office of Educational Research and Improvement. The OESE program with the most projects in the Catalog is the Women's Educational Equity Act Program with seven computer education projects located in Parts I and II of the Catalog.

The Office of Program Planning and Evaluation provided three abstracts totalling $5 million. However, these funds, particularly in the Chapter I Evaluation Technical Assistance Centers, are not exclusively devoted to computer education activities.

The Office of Vocational and Adult Education is represented by 33 projects totalling close to $2 million in multi-year funding. Twenty-eight of these are fairly small grants for adult basic education computer based activities which are funded as discretionary projects through the States.

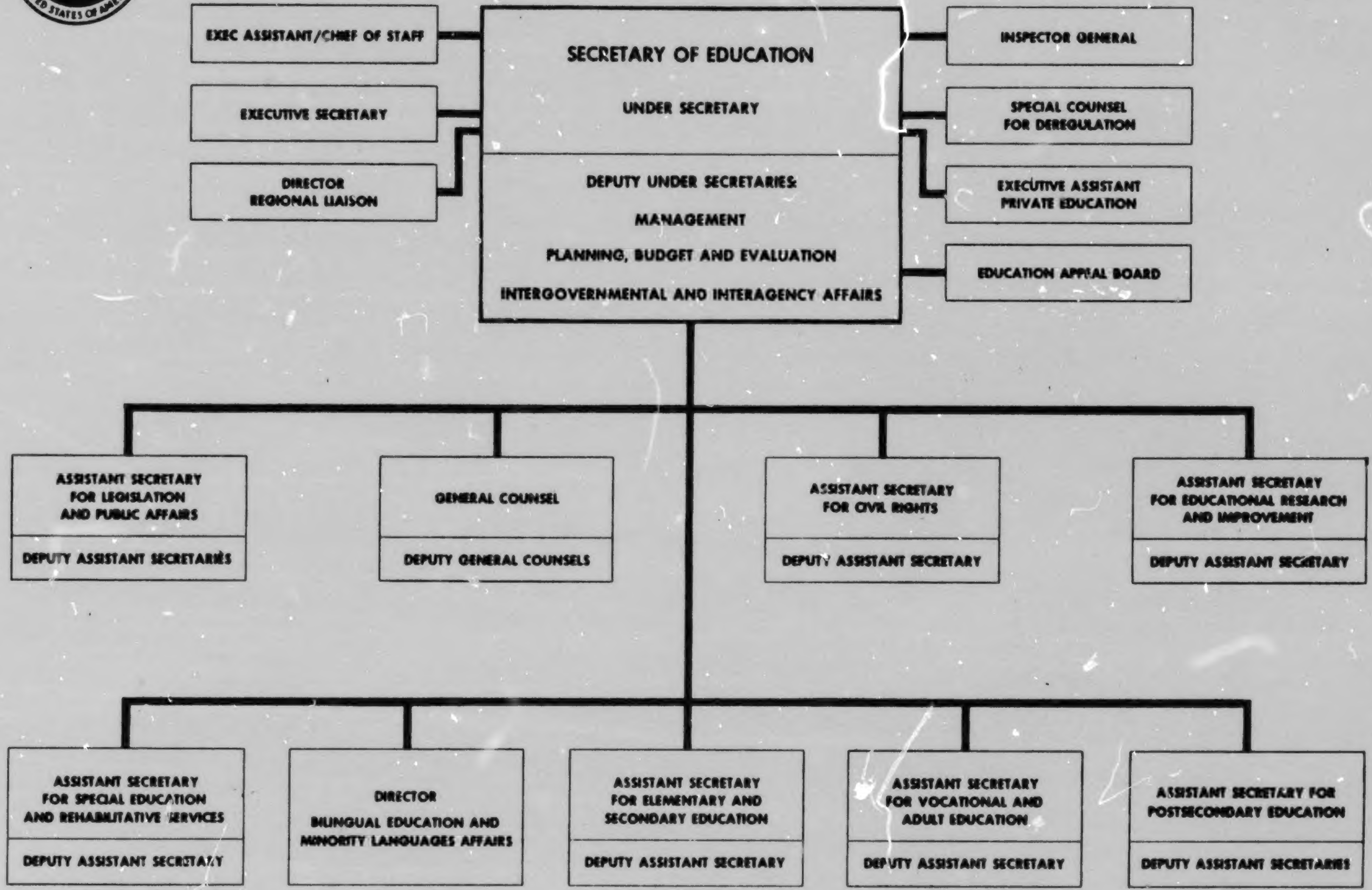
Finally, the Office of Management submitted two "in-house" Department of Education supported computer activities (pages 151,156).

The Catalog's index of projects by their sponsoring offices within the Department of Education should enable users to identify types of activities of interest to the various offices. For your convenience, an organizational chart of the Department of Education is located on the next page.

Susan S. Klein

# DEPARTMENT OF EDUCATION

APPROVED: T. H. Bell
T. H. BELL
DATE: 9-1-81



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ASSISTANT SECRETARY FOR SPECIAL EDUCATION AND REHABILITATIVE SERVICES
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ASSISTANT SECRETARY FOR ELEMENTARY AND SECONDARY EDUCATION
DEPUTY ASSISTANT SECRETARY
ASSISTANT SECRETARY FOR VOCATIONAL AND ADULT EDUCATION
DEPUTY ASSISTANT SECRETARY
ASSISTANT SECRETARY FOR POSTSECONDARY EDUCATION
DEPUTY ASSISTANT SECRETARIES

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# PROJECT ABSTRACTS

## I. DEVELOPING STUDENTS COMPUTER LITERACY

A. Elementary and Secondary Levels
B. Adult and Postsecondary Levels
C. Computer Science Students and Faculty

## ADAPTIVE LEARNING ENVIRONMENTS: COMPUTER PROGRAMMING IN A DEMONSTRATION CLASSROOM

TARGET AUDIENCE: Kindergarten through third grade students

AWARD: Institutional Grant NIE-G-83-0004 12/01/1982--11/30/1984
Cost: $76,000

The Learning Research and Development Center maintains a demonstration-research classroom for elementary school children in grades K-3. The classroom is both a demonstration site for educational practices that are adaptive to individual differences among students and a laboratory for trying out new ideas aimed at improving adaptive instruction in schools. The classroom is equipped with Apple II microcomputers on which students are taught the rudiments of LOGO, a computer language for young children. Extensive and detailed observations of students' use of these resources is now under way; results will be used to modify and refine existing LOGO techniques.

For the past two summers the Center has also offered a 5-week summer day camp to teach computer literacy to children from grades 2-8. The younger children were taught LOGO, and the older children were introduced to BASIC.

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## EQUAL ACCESS TO COMPUTER EDUCATION FOR ETHNIC MINORITY FEMALES

TARGET AUDIENCE: Ethnic minority female students in grades K-9

AWARD: Grant #G00-83-02953 10/01/1983-9/30/1984 Cost: $86,500

The purpose of this project is to reduce the disparity in computer skill acquisition levels and interest between K-9 ethnic minority girls and other population groups. The effects of dual discrimination on ethnic minority women in the area of computer science is evidenced by the low numbers enrolled in computer science programs at the college level and by the low numbers employed in fields requiring advanced computer skills.

Community School District 3 of New York City uses computers to provide instruction that develops literacy and the actual ability to program. It does not use computers for remedial activities as do most other school districts. The primary computer language used in District 3 is LOGO. It will use this approach to develop staff development activities and student instructional activities which stress equal educational opportunities for ethnic minority females in computer sciences.

MAJOR PRODUCTS: Demonstration model

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## COMPUTERS IN EDUCATION: A QUESTION OF ACCESS

TARGET AUDIENCE: Students in grades 1-6, primarily girls

AWARD: Grant #G00-83-03379 10/01/1983-9/30/1984 Cost: $88,786

Research has found fewer girls than boys having access to computers, particularly in schools serving lower socio-economic populations. Both research and empirical observation indicate that the problem is at least two-fold: (1) fewer girls than boys are being provided access to microcomputers, and (2) most microcomputer software and activities are designed to appeal exclusively to boys. It is also evident that these problems start as early as elementary school.

The purpose of the project is to produce introductory computer literacy software and a slide-tape for primary-grade students, designed to counteract the access barriers. A handbook for teachers recommending strategies for using the software and slide-tape and evaluation criteria for assessing educational software vis-a-vis its appropriateness for girls will also be developed.

MAJOR PRODUCTS: Microcomputer literacy software that introduces students to a wide range of applications of the computer and which includes topics that may be of interest to girls and activities that involve cooperation, rather than competition.

Slide tape introducing computers with an emphasis on equity.

Teacher's manual that introduces microcomputer literacy and issues of equity, that contains software evaluation guidelines for equity, that recommends activities to accompany the slide-tape and software, and that contains student handouts and activity sheets.

A monograph which synthesizes research on equity in microcomputer access and software and can serve as a tool to promote awareness and as a foundation for further research and practice.

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## PROJECT LITT: LEARNING IMPROVEMENT THROUGH TECHNOLOGY

TARGET AUDIENCE: Staff (teachers, administrators, support personnel, and specialists) and student populations (including English as a Second Language, Gifted and Talented, and Learning Disabled) at identified schools, K-12

AWARD: Grant #G00-83-03364 10/01/1983 to 9/30/1984 Cost: $133,645

This project is designed to increase student achievement in science, mathematics problem solving, reading, and writing through applications of technology in the classroom. It is aimed at increasing initial experiences using computer assisted instruction (CAI) within curricular areas, using LOGO to promote problem solving skills, and using word processing software to enhance writing. In addition, Time Share Corporation's computer managed instruction (CMI) software, "The Answer," will be implemented on an IBM PC-XT microcomputer system, 256K memory and 10 megabyte disk, to manage the mathematics and reading programs at four elementary schools. The prototype CMI systems will be evaluated and modified as required over a three-year period before systemwide implementation is considered. This project will provide additional CMI staff training opportunities and allow expansion of the teacher training by establishing a training and software evaluation center.

The training center will consist of 15 Atari 800XL microcomputer stations, 64K memory, with networking capability. An Apple microcomputer system will provide additional software preview and evaluation opportunities. Provisions for staff assistance and adequate training materials and software will be made.

The purpose of these pilots is to identify appropriate software and teaching strategies which can be implemented systemwide. It is hoped that the diverse student populations involved in the pilots will provide valuable information in regard to the effect of computer experiences on learning styles and achievement in mathematics, science, reading, and writing.

MAJOR PRODUCT:
- Computer Literacy Curriculum Guides (Elementary, Intermediate, and High School)
- Resource Materials Kit
- Teacher Training Manuals
- Commercial Software

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON |
|---|---|
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## PRACTICAL SOLUTIONS TO OVERCOMING INEQUITABLE COMPUTER USE

TARGET AUDIENCE: The solutions generated by this study will be designed for educators at all levels to improve the access and use of computers among girls and minority students in grades 1-9.

AWARD: Grant G-00-83-03375 10/1983 to 9/1984 Cost: $91,535

Recent gains in closing educational gaps and moving toward balanced opportunities between the sexes and among ethnic cultures are now in jeopardy as computers move rapidly into the educational sector. A new class of disadvantaged is being created: the class of the computer illiterates. And women and minorities are the major constituents of this class.

The project will provide a comprehensive, empirical definition of the factors that produce inequitable access to computers and computer knowledge for women and minorities; generate a list of potential solutions that would result in equitable access; and develop a self-assessment instrument for use by educators to identify the inequitable access factors operating in districts and/or classrooms.

The approach is a systematic data collection that will include individuals to whom such inquitable practices occur. We will collect critical incidents--actual events in which the respondent was directly involved--that provide detailed descriptions of a specific behavior. Educators, students, and parents will contribute these incidents. A content analysis will sort incidents into categories of events. Several frames of reference will be used (e.g., nature of the event, key actor, grade, how the computer was used) to comprehensively define what events are occurring, to whom they most frequently occur, and in what context. Potential users will develop practical solutions for providing equitable computer access and use to girls and minority students in grades 1-9.

MAJOR PRODUCTS: A definition of the factors that produce inequitable access to young women and minorities, categories of solutions to increase access, and a self-assessment instrument for educators.

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# COMPUTERONICS

TARGET AUDIENCE: Gifted and high-achieving students in grades 6 and 7. Training available for teachers of these students.

AWARD: G008202258 9/1/82 to 8/31/86 COST: $99,707 (two years)

COMPUTERONICS is a 35-40 hour course in programming, problem solving, and computer literacy. COMPUTERONICS provides students an opportunity to learn a simple programming language, use computers to solve problems, and see the ways that computers affect their lives. The course consists of two units. "Computers in Society" conveys information about the history of computers, their present and future uses, and computer-related careers. The student text, which employs a magazine format, includes articles, photos, ads, and a glossary. Because of the rapid change in technology, this unit is easily augmented by including current magazine and newspaper materials. "Problem Solving with Computers" teaches students to program using the BASIC computer language. Students use their programming skills in solving word problems. This unit uses a combination of paper and pencil and hands-on activities. This combination allows as many as 10 students to work with a single computer. The materials are not hardware specific and can be easily adapted to a variety of delivery systems.

Both units use a mastery learning approach: each unit objective must be mastered before a student moves on to the next. The management system built into students lesson books, activities, and mastery answer book allows the students to move at their own pace.

Approved by the Joint Dissemination Review Panel, COMPUTERONICS has received dissemination funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what COMPUTERONICS offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. COMPUTERONICS has been implemented successfully with Apple, Atari, Commodore Pet, Ohio Scientific Instruments, Radio Shack microcomputers and with mainframes. "Computers In Society" material for a class of thirty costs about $150 and includes a Teacher's Guide, Student Lesson Books, Activity Packets, Parent Report Pad, and Mastery Record Pad. "Problem Solving with Computers" materials cost about $260 for a class of thirty and include the Teacher's Guide, Student Lesson Books, Activity Packets, Sidetrips, Parent Report Pad, and Mastery Record Pad. Two days of training are required to adopt the program.

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## COMPUTER EQUITY TRAINING PROJECT

TARGET AUDIENCE: Students at the middle school level

AWARD: Grant #G00-83-02954 10/01/1983-9/30/1984 Cost: $133,914

The purpose of this project is to identify and analyze the causes of the disparity in computer learning between girls and boys at the middle school level; to develop model strategies that will help break the barriers to voluntary computer learning; and to raise the awareness of teachers and administrators by training them to employ new approaches to computer learning.

MAJOR PRODUCTS: Implementation manual for teachers.

PROJECT DIRECTOR:

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INTEREST WORLD: PRE-COLLEGE MATHEMATICS IN A COMPUTER CULTURE

TARGET AUDIENCE: Middle elementary and junior high students

AWARD: Contract SED 80-12648 9/01/1980-7/31/1982 Cost $165,434

This project will develop an alternative to the traditional uniform mathematics curriculum. The new model of education will be computer-based "interest worlds". These interest worlds will serve as significant routes into the achievement of "computer literacy" on a broad scale. The key idea behind the project is: If people have developed a serious interest and significant expertise in some activity and its associated body of knowledge, then it should be possible to design computer systems that help them pursue that activity and at the same time draw on their expertise and emotional attachment to support mathematics learning. Four interest worlds will be developed: Words World, Games World, Music World, and Animation World. The interest worlds will be tested in a 6-week summer program for 24 mid-elementary to junior high school youngsters.

MAJOR PRODUCTS: Final report.

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# MATH AND COMPUTER EQUITY PROJECT

TARGET AUDIENCE: Elementary and secondary teachers; ultimately female and minority students in math and computer science courses

AWARD: Grant# G00-83-02786 10/01/1983-9/30/1984 Cost: $24,249

The purpose of this project is to provide training for 200 elementary and secondary teachers in spatial visualization and computer equity; to disseminate math-related equity materials through newsletters, workshops, and through the establishment of a resource center; and to evaluate the ongoing changes in enrollment figures for high school math and computer science courses. The project will provide the equity component of a district pilot project in computer education for 15 schools in the Albuquerque Public Schools.

The project staff and advisory committee represent both men and women, as well as the four major cultural groups in New Mexico. As the advisory committee works with the project staff during the course of the project, the concerns of ethnic women will be an integral part of each activity.

Ultimately, the project will impact the enrollment of girls and minority students in math and computer science courses, and reinforce the district's commitment to Title IX.

MAJOR PRODUCTS: Demonstration model, evaluation report

PROJECT DIRECTOR:

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## COMPUTER LITERACY PROJECT

TARGET AUDIENCE: All ninth-grade students. Training available for teachers.

AWARD: Grant G008301573 11/1/83 to 10/31/87 COST: $49,517 (first year)

Guided by the philosophy that computer literacy is a basic skill that all students should have before graduating from high school, the Computer Literacy Project seeks to give all students a basal level of literacy and competency in computer science through hands-on experience. The program also seeks to provide students who have aptitude and interest in computers the opportunity to develop higher level skills in computer science and programming.

The Computer Literacy course features a well-defined sequence of instruction. The contents of the one semester course are: Computers and History; Computer Processes; Arithmetic Hierarchy; Variables and Constants; Flowcharting; Basic Language; Vocabulary; and Programing. Eighteen Commodore PET microcomputers and tape drives, three dual disk drives, and three printers accomodate 150 students daily in three sections of Computer Literacy each semester.

Approved by the Joint Dissemination Review Panel, the Computer Literacy Project has received dissemination funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what the program offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. Training of staff requires approximately one-half day. The principal cost is equipment, which will vary greatly depending on the number of students to be served.

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# HIGH SCHOOL CAREER ENTRY COMPUTER SKILLS DEMONSTRATION PROJECT

TARGET AUDIENCE: Limited English Proficient (LEP) students in grades 9-10 whose dominant language is Spanish and who are preparing to enter the job market

AWARD: G00-83-01552 7/01/1983 to 6/30/1986 Cost: $500,000 over a 3-year period

This project proposes to build the capacity of West New York district teacher trainers and high school teachers of LEP students in teaching career-entry computer skills and to evaluate the development of entry-level computer skills by high school students trained by these teachers.

Four Apple-IIE computers will be used for students' hands-on practice.

A primary goal will be to produce a Career Entry Computer Skills Curriculum which has wide applicability for teachers and administrators working with LEP students.

MAJOR PRODUCTS: Career Entry Computer Skills Curriculum
Replication materials

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# COMPUTER LEARNING CENTER
# MODULE DEVELOPMENT PROJECT 1983-1984

TARGET AUDIENCE: Students of varying academic abilities in seven high schools.

AWARD: Contract #G00-83-03404 12/31/1983 to 12/31/1984 Cost: $140,000

The purpose of the Computer Learning Center Module Development Project is to develop a technology-based curriculum for secondary students that will be correlated to the computer literacy program already in place in the Houston Independent School District (Houston ISD). The curriculum will be organized into four strands: Basic Skills - Problem Solving; Computers as Tools; Computers in Society; and Future Trends. It will be further subdivided into appropriate objectives and activities. The strands will contain instructional activities such as computer modules, slide presentations, video cassettes, filmstrips and printed materials. These will be directed toward increasing higher level thinking skills necessary for critical reading, creative writing and problem solving in mathematics and science. The first year of the project will be devoted to developing the curriculum, field-testing of activities, training the faculty, procuring the necessary equipment and disseminating the curriculum to the schools in which it will be taught. During the second year of the project, a pilot study of the curriculum will be conducted in six Houston ISD high schools and one nonprofit private high school. The curriculum will be modified and improved as feedback from teachers and students becomes available.

MAJOR PRODUCTS:

Secondary Computer Literacy Curriculum Materials, including: objectives, classroom activities, and lesson plans.
Program Evaluation Forms.
Criterion-Referenced pre and posttests for students.
Training modules for teachers and administrators.
Written document outlining project implementation and key decisions.

PROJECT DIRECTOR:

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## PROJECT COFFEE (Cooperative Federation For Educational Experiences)

TARGET AUDIENCE: Educators of, and private sector personnel concerned with, alienated/disaffected secondary students.

AWARD: Grant G008201709 9/1/82 to 8/31/86 COST: $72,664 (two years)

Project COFFEE is an alternative occupational education program in high technology for alienated/disaffected youth. Project COFFEE has uniquely integrated four components: an academic component that provides relevant(occupational and life-coping) basic skills instruction based on an individualized educational plan; an occupational component that provides hands-on educational experiences in an adult-like high technology work environment while reinforcing basic skills; a counseling component that provides occupational and emotional support utilizing state, regional, and local service agencies; and physical education component that offers a program of recreational activities adapted to enable students to develop a sense of self-accomplishment and group cooperation. Each occupational program features job entry skills, job skills shadowing experiences, and a related work study program. Occupational components include: electronic assembly, data processing, building and grounds maintenance, horticulture/agriculture, and distributive education.

Project COFFEE was developed by a regional cooperative federation of seven school districts and a highly successful partnership with high technology business and industry. This partnership has provided educational assistance in curriculum development, staff training, occupational training materials, equipment acquisition, competency-based assessments, internship experiences, and more. Materials include: program manual, basic skills curriculum guide, guidelines for industry/education linkage, guidelines for inter-agency collaboration/community outreach, procedures manual for development of competency-based assessments, and diagnostic needs assessment survey manual for student survival skills course.

Approved by the Joint Dissemination Review Panel, Project COFFEE has received dissemination funds from the National Diffusion Network to make public and non-profit schools, colleges, and other institutions aware of what Project COFFEE offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available.

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# A HIGH SCHOOL COURSE INTEGRATING STATISTICS AND COMPUTER PROGRAMMING

TARGET AUDIENCE: High school students and teachers

AWARD: Contract SED 80-24212 7/15/1981-12/31/1982 Cost $31,623

The goal of this project is to design, conduct, and evaluate a high school course which integrates non-calculus statistics with computer programming. The product will be an instructor's course guide with associated student materials, (e.g., programming exercises, statistical problems to be solved with the computer). The computer will be used for three purposes: (1) to teach programming in the BASIC language; (2) to serve as a sophisticated computational tool for statistical calculations; and (3) to display commercial statistical programs which simulate experiments too costly or too time-consuming to be conducted by high school students. As students progress through the course, they will gradually build a statistics package which can be used at the end of the course to analyze a practical problem requiring statistical treatment.

Potential outcomes of the course are projected as follows: (a) by writing and interacting with their own computer programs, students will become more knowledgeable of computer capabilities and limitations; (b) through the teaching of computer programming the student's problem-solving capabilities will be heightened by careful analysis of a problem and the steps required to complete it successfully; (c) the selection of statistical problems for computer programming will result in a more thorough understanding of the statistical concepts and formulas. Students will use self-designed computer programs to do involved calculations which, if done manually, would require inordinately large amounts of time. Students thus will be able to spend more time interpreting the results of their calculations.

MAJOR PRODUCTS: Final report.

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## COMPUTER LITERACY FOR ADULT BASIC AND ADULT HIGH SCHOOL STUDENTS

TARGET AUDIENCE: Adults with less than a high school education.

AWARD: TEC-19 July, 1982 - June, 1983 COST: 20,655

The purpose of this program is to work with 50 adult basic and adult high school students to provide computer literacy and basic skills instruction. The computer literacy component will provide students with knowledge and skills of computer technology and related career opportunities. The literacy instruction will utilize the computer awareness information and the computer to teach the basic skills of speaking, listening, reading, writing, and computation.

The developers will design, organize and implement a computer literacy instructional program for adult basic and adult high school students; i.e., skills in utilizing and applying computer hardware and software, career alternatives, and basic programming skills. Adapt the Washington County School District K-12 basic literacy competency computer software programs for use with adult students. Provide computer assisted instruction to 50 adult basic and adult high school students to teach the basic skills of speaking, listening, reading, writing, and computation. Provide the Utah State Office of Education with a documentation dissemination report, copies of the public domain educational software developed and/or adapted, and other instructional materials written for teachers and students.

MAJOR PRODUCTS: Adapted instructional software.

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# COMPUTER AWARENESS: ITS PLACE IN ADULT EDUCATION

TARGET AUDIENCE: Individuals with Adult Basic Education, classroom teachers, Adult Basic Education program directors

AWARD: TEC-6 September 13, 1982 - June 30, 1983 COST: 21,155

This program is designed to provide introductory computer awareness to staff and students at selected adult education programs in Indiana, to initiate the use of computer assisted instruction in selected adult basic education programs in Indiana, and to determine which adult education programs in the state can obtain the use of microcomputers that are currently located within their school systems.

One-day workshops on computer awareness will be conducted at eight adult basic education sites. Participants may include both staff and adult students. The inclusion of both teachers and students in the same workshop is innovative and appropriate due to the state-of-the-art classroom microcomputing with ABE students.

A microcomputer will be purchased and commercially developed software will be used.

The project will contact, aid, and support adult program directors in the state in order that they may obtain the use of microcomputers that are currently located within their K-12 school corporations.

An evaluation committee will monitor the extent to which project objectives and activities are being met.

Workshop participants will be administered pre/post tests to measure the degree to which their level of computer awareness increased.

MAJOR PRODUCTS: A final report

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## READI (RURAL EDUCATION/ADULT DEVELOPMENT IN IDAHO): A COMPUTER READINESS PROGRAM FOR RURAL ADULTS

TARGET AUDIENCE: Cooperative Extension Service staff and rural adults

AWARD: Grant G0083-02825 10/01/1983-9/30/1986 Costs: $301,784

The READI Project will utilize the Cooperative Extension Service and peer teachers to deliver courses in computer readiness and literacy. Modeled on the New Dimensions Program, READI will design courses in Math Readiness, Language Readiness and Computer Literacy. As a result rural adults, whose lack of appropriate skills has prevented them from entering the computer age, will be able to participate in new educational and employment opportunities, and CSE will be able to reach a larger and more diverse rural constituency. READI will make a significant and innovative contribution to the emerging computer science pedagogy and will pioneer a cost-effective method of adult education by integrating theories about math anxiety and adult development with techniques for peer-teaching and rural outreach.

MAJOR PRODUCTS: Course in computer readiness and literacy

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## COMPUTER RELATED CAREERS FOR WOMEN OFFICE WORKERS

TARGET AUDIENCE: Women office workers

AWARD: Grant #G00-83-02790 10/01/1983-9/30/1984 Cost: $24,635

The purpose of this project is to give women office workers the skills and knowledge they need to enter word processing and professional computer fields. It will design an introductory curriculum, outreach materials and additional publications for ongoing use by an assortment of education-providers, both corporate and academic, who shape computer training. The curriculum will be tested on a group of 30-50 office workers in collaboration with Cleveland State University, and then in an intensive one-day session in Atlanta in cooperation with Atlanta Working Women and the Office of the Mayor. The curriculum and other materials will be reviewed by advisors and consultants and then revised.

During the second year of the grant, the curriculum and other materials will be disseminated widely and the results of the project will be publicized. Follow-up assistance will be provided to educators and employers to assist them in incorporating the introductory curriculum and additional materials into existing training and counseling programs. Near the end of the second year, the project will sponsor a national conference to assess the current status of computer education in the United States.

The project should change employers', manufacturers' and educators' perceptions of the capabilities and educational priorities of women office workers, and give them the tools with which to begin to tailor computer training to the needs of such women. The overall outcome will be to increase the awareness and learning activity of clerical workers regarding career planning and advancement into satisfying, computer-related occupations.

MAJOR PRODUCTS: Introductory curriculum

PROJECT DIRECTOR:

Ellen Cassedy
Working Women Education Fund
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Cleveland, Ohio 44115
(215) 842-2617

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## NEIGHBORHOOD TECHNOLOGY PROJECT

TARGET AUDIENCE: Minority and non-minority working class and reentry women

AWARD: Grant G0081-01655 9/01/1981-8/31/1984 Cost: $201,941

The Neighborhood Technology Project addresses the lack of critical literacy in mathematics and technology for low-income women in a community-based setting. Earning power and ability to shape the future are hampered by lack of skills. Students are handicapped by fear of mathematics and lack of access to technical skills. The project will develop pre-college and college level curriculums in mathematics, statistics and cooperative learning with area industries. Motivational workshops and extensive career counseling are part of program design which will include access to an elite curriculum in a neighborhood setting; significant exposure to the available technology; work experience (for credit) in business, the social services and community organizations; significant grasp of highly marketable "hard skills" (multi-languages; state of the art equipment); and development of an interdisciplinary curriculum that connects the technology with wider context in the social sciences, the humanities and the wider community.

MAJOR PRODUCTS: Final report.

PROJECT DIRECTOR:

Ellen Tichenor, Director
Community Women's Education Project
1340 Frankford Avenue
Philadelphia, Pennsylvania 19125
(215) 426-8610

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## PREPARING FOR HIGH TECHNOLOGY CAREERS IN COMPUTER INTEGRATED MANUFACTURING AND INFORMATION MANAGEMENT

TARGET AUDIENCE: Technical students in computer integrated manufacturing

AWARD: 8/01/1983 to 7/31/1986 Cost: $450,000

Demand by employers for qualified technicians in Computer Integrated Manufacturing and Information Management far exceeds the supply. Engineering automation is being integrated into manufacturing at a rate of 30% annually. The greatest need is for the super technician who can install, operate, maintain, repair, and manage new systems. This project will identify automation skills required in automated manufacturing, electrical design and information management; develop new and modify existing curriculum, including software and courseware; and update current industry and educational employees. The project will be evaluated and materials disseminated nationally.

MAJOR PRODUCT: Final report.

PROJECT DIRECTOR:

Victor Langer
Instructional Resource Coordinator
1015 North Sixth Street
Milwaukee, Wisconsin 53203
(414) 278-6247

ED. DEPT. CONTACT PERSON:

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## MODEL PROGRAM FOR COMPUTER LITERACY AT AN UNDERGRADUATE LIBERAL ARTS COLLEGE

TARGET AUDIENCE: Undergraduate students and faculty with some special attention to women and individuals with little or no experience in computers

AWARD: Grant G0081-01775 8/01/1981-7/31/1984 Cost: $221,439

Vassar College will develop, test and evaluate a model sequence to make liberal arts undergraduates computer literate. The program is addressed to all undergraduates but particularly to those with little or no interest and experience in computers. It will bring the technology to these students in their regular liberal arts course work; it will offer them a way to learn, integrate and retain computational skills within their own disciplinary interests.

The program has three parts that will be repeated on a rolling basis over the six semesters of the project duration. First, in a intensive workshop, selected Vassar faculty from every curricular division will learn how to use the IDUNET network, what of its resources are applicable to their disciplinary interests, and how they might refocus present courses to use network resources. A core course will be offered to all Vassar students in which adjunct faculty (who have done the workshop) teach materials of their disciplines using computer technology. This course has a "hands-on" laboratory component. Follow-up courses in the sequence are regular course offerings of adjunct faculty that have been redesigned to exploit computer technology. Participating students will take both the core course and one of the follow-up courses.

This model should be replicable elsewhere, and it is cost effective. It may prove to be a useful model for integrating other perspectives, such as those of women's studies or global perspectives, into the mainstream of an undergraduate liberal arts curriculum.

MAJOR PRODUCTS: A final report describing the computer literacy program for students and faculty.

PROJECT DIRECTOR:

William H. Prichard, Jr.
Coordinator of Computer Literacy
Literacy Program
Vassar College
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Poughkeepsie, New York 12601
(914) 452-7000

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# COMPUTER LITERACY FOR FACULTY

TARGET AUDIENCE: Administrators, faculty and students in an institution or higher education.

AWARD: G00-82-02936 10/01/1982 to 9/30/1986 Cost: Yr. 1 - $39,875
Yr. 2 - $58,865

The purpose of this computer literacy activity is to create and sustain an academic environment in which faculty and students can become familiar with computers, their capabilities and limitations, and to know how to use them to supplement the study of their particular disciplines. During the first year of the project, the Activity Director will design two computer-awareness workshops--one for faculty and another for students. The workshop for faculty will focus on how the computer affects our daily lives, and how it can be use by a teacher in the classroom to facilitate a lesson plan. The workshop for students will also focus on how the computer affects our daily lives, but will emphasize how it can be used to help master classroom assignments.

After all instructors have had an opportunity to attend the computer-awareness workshop, the design narrows its focus to include five instructors from each of nine different departments in the college. These instructors will be divided into three groups. These groups will move through a series of four seperate workshops designed to give hands-on time with computers so that instructors will not only be able to program computers, but will also be able to teach others this process.

The second workshop to be taken by selected faculty will be a twelve-hour course designed to make participants computer literate. Faculty members will learn how to operate at least one commercial program as well as have knowledge of what commerical programs are available. The third workshop will be a twenty-hour programming course designed with a view toward exposing the instructors to a computer language and to give them an opportunity to explore ways in which the computer could augment the instructional process. The last workshop will involve sending the core-group instructors back to the computer to implement some of the objectives that were identified as being helpful to classroom management and instruction.

MAJOR PRODUCTS: System Implementation Guidelines
Guide for Suggested Use of Computers

PROJECT DIRECTOR:

Roger Seamands
Kirkwood Community College
Post Office Box 2068
Cedar Rapids, Iowa 52406
(319) 398-5486

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# DEVELOPMENT OF COMPUTER RELATED ACADEMIC PROGRAMS

TARGET AUDIENCE: College faculty and students at all levels

AWARD: G00-82-01695 10/01/1982 to 9/30/1989 Cost: $1.1 million

The Pfeiffer College activity for computer related academic programs has three major components: 1) The development of an information science major that combines a high level of understanding of computer systems and analysis with a strong background in business and/or accounting; 2) the integration of course work in other professional programs with the computer applications generic to those fields (e.g., computer crime for law enforcement majors); and 3) a computer literacy emphasis in general education to insure that all Pfeiffer students graduate with a working knowledge of computers/computer systems and the implications for their lives and the nation's future.

To implement these components of computer related academic programs, Pfeiffer will conduct enabling activities which include: 1) Hardware acquisition--prime computer equipment will be purchased and installed on the main campus and the Charlotte campus during FY 82 and FY 83; 2) faculty training in computer programming languages and applications as follows: a. Business and Economics faculty will receive training in FY 83 in BASIC COBOL and will develop and incorporate computer applications into their programs in year FY 84; b) natural and Health Science faculty will study BASIC & FORTRAN in FY 85 and will incorporate use in FY 86; c) the arts and Humanities faculty will follow the same sequence beginning in FY 86; 3) preparation and piloting of syllabi for each year of the information science major curriculum course developed in one year will be piloted the following year; and 4) courses for building the computer literacy thrust will be implemented over the period of the grant with FY 87 as the pilot year.

These activity thrusts will operate on hardware by PRIME. In addition to the Prime 1000 system which the institution has acquired through its own resources, Title III will provide for the acquisition of additional memory units, disc drive, tape drive, ports and peripherals, including CRT terminals, graphic terminals, printers and a X-4 plotter. The PRIME 450 mini computer and associated terminals and modern will be installed at the Charlotte campus.

MAJOR PRODUCTS:
Information Science Major
Computer Literacy Curriculum
Software Applications
Faculty Expertise
PRIME Hardware

PROJECT DIRECTOR:

James Oliver
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Pfeiffer College
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## WILKES COLLEGE--DEVELOPMENT OF INSTRUCTIONAL COMPUTERS

TARGET AUDIENCE: College computer science majors and non-majors in a predominately white four-year institution in a coal mining region.

AWARD: G00-82-02228 10/01/1982 to 9/30/1987 Cost: $128,682
(FY 1983)

Primary objectives of the project are to "develop new academic programs in Computer Information Systems (CIS)," to attract and retain computer science students and to provide general computer literacy for the remainder of the student population. Additionally, selected faculty members will undertake additional graduate studies to assist in implementation of the new CIS programs.

In the first year of the project, curriculum development for a minor will be completed and advanced training for faculty will begin. Also in Year One, the Department of Mathematics and Computer Science will develop and offer a computer literacy course for non-majors. Computer applications will start to be introduced into various academic disciplines. By the end of Year Three, curriculum for a CIS major will have been completed for introduction at the beginning of Year Four.

MAJOR PRODUCTS: Graphics Laboratory which will contain not only hardware (micro-computers, terminals, etc.) and software needs of the CIS programs but also computer-related needs of four targeted science areas.

PROJECT DIRECTOR:

Joseph Bellucci
Strengthening Program Coordinator
Wilkes College
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# CURRICULUM DEVELOPMENT IN THE COMPUTER SCIENCE AREA

| | |
|---|---|
| TARGET AUDIENCE: | Students in four-year colleges with an interest in computer science. |

AWARD: G00-83-01883 10/01/1983 to 9/30/1987 Cost: $249,027

Because the development of new curriculum offerings and effective instruction are critical to the survival of institutions, the development of three computer related programs over the next three years is proposed:

1. Developing a two-year Associate degree program in computer technology. This program will develop skills pertaining to information processing which involves programming languages and basic knowledge about computer systems.
2. Developing an accredited Bachelor's degree program in computer science.
3. Offering a complete program in word processing as a means to strengthen the office administration curriculum.

A two-year Associate degree and a four-year major curriculum in computer science, in computer technology and word processing with relative emphasis on math, physical sciences and business, will produce marketable skills for Wiley College students with the help of those Title III, part B funds.

| MAJOR PRODUCTS: | | |
|---|---|---|
| | 5 | IBM 5251 Display Stations |
| | 2 | IBM 5256/003 Printers |
| | 3 | Dedicated Word processing Units with printer |

PROJECT DIRECTOR:

Warren H. Hawkins, Jr.
Title III Coordinator
Wiley College
711 Rosborough Springs Road
Marshall, Texas 75670
(214) 938-8341 Extension 234

ED. DEPT. CONTACT PERSON:

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## A BEGINNING COURSE IN COMPUTER SCIENCE

TARGET AUDIENCE: Computer Science Faculty and Students in Minority Institutions

AWARD: Grant G0081-02167 9/1981-8/1984 Cost: $367,008

The problem of computer literacy will be addressed at forty (40) minority institutions by means of a collaborative effort by the Resource Center for Science and Engineering at Atlanta University and the Continuous Learning Corporation of Cambridge, Massachusetts. The project will entail the development, dissemination, and implementation of a first course in computer science for prospective majors and non-majors at the institutions. Activities of the course will include "hands on" experiences, familiarity with terminology and capability, applications, manipulation of symbolic notation and logic, and programming in BASIC. Intended outcomes are as follows: cost-effective instruction and literacy; development of interpretative skills and facility with symbolic and mathematical language; sophistication with computers; and transportability to institutions and/or consortia not immediately served by the project.

MAJOR PRODUCTS: A beginning course in computer science

PROJECT DIRECTOR:

Paul L. Brown
Resource Center for Science
and Engineering
Atlanta University
223 Chestnut Street, S.W.
Atlanta, Georgia 30314
(404) 681-0251 X320

ED. DEPT. CONTACT PERSON:

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# STUDENT CENTERED TRAINING FOR COMPUTER SCIENCE INSTRUCTORS IN SMALL LIBERAL ARTS COLLEGES

TARGET AUDIENCE: Computer science instructors and their students

AWARD: Grant G0083-02814 7/1983-7/1986 Cost: $160,015

The inclusion of required computer courses for general education and business majors has greatly expanded the need for qualified computer teachers. Highly competitive salaries, scarcity of personnel and inexperience in hiring have resulted in small liberal arts colleges not able to compete. The consequences of this situation are severe because students are experiencing great difficulty in the courses. Additionally, there is no agreement on content or a tradition for this content within the liberal arts curriculum. Alleviation is proposed by providing special training, curriculum development and annual conferences to examine the implications of technology. Such training would immediately provide an essential service to nine members of the Association of Independent Colleges of Nebraska and later to comparable colleges nationwide. Specific project activities include: (1) summer training programs for new and practicing computer science teachers which emphasize student centered teaching, "people skills," diagnostic and classroom climate measures, expansion of repertoire of teaching strategies, and information and strategies for helping women, low income and minority students to succeed; (2) compilation of background information on students for use in decisions on course content, methodology and advisement; and (3) the preparation of content appropriate for these students.

MAJOR PRODUCTS: An instrument to predict success in teaching computer science course content for computer science students in liberal arts colleges

PROJECT DIRECTOR:

Mindy Brooks
Assistant to the Vice President/
Dean
Union College
3800 South 48th Street
Lincoln, Nebraska 68506
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# DEVELOPMENT OF A COMPUTER SCIENCE MAJOR

TARGET AUDIENCE: Administrators and undergraduates in an institution of higher education

AWARD: G00-82-02941 10/01/1982 to 9/30/1986 Cost: Yr. 1 - $50,000
Yr. 2 - $42,290

The primary purpose of this Title III project is to develop, pilot and implement an undergraduate computer science major as a component of the liberal arts curriculum at Bethany College. A second objective relates to the improvement of faculty skills in computer-assisted instruction, and to the development of "hands-on" computer aspects within courses in other disciplines (e.g., music, education, and sociology). The Academic Dean and the faculty curriculum committee will annually identify a minimum of three faculty members who wish to participate in such professional growth and curriculum development activities. Each year the selected faculty will develop curricular plans for the inclusion of computer components within existing course syllabi.

The computer science curriculum model will be designed during the first year of the grant. The curriculum model will include course outlines, syllabi, interactive program experiences, needed library resources and will interface with the need to provide students in other academic disciplines with computer science backgrounds (e.g., business-economics, education and sociology).

Newly developed computer science courses will be phased into the curriculum by the end of the third year of the grant. Expansion of the small micro-computer laboratory will be accomplished through purchase and installation of twenty-five microcomputer units and related hardware, software and desk/chair units. The computer science faculty will be providing training and professional development opportunities on an annual basis. Formal evaluation of the pilot implementation of the computer science curriculum will occur during the fourth year of the grant.

MAJOR PRODUCTS: Computer Science Curriculum
Teacher's Guide

PROJECT DIRECTOR:

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Bethany College
Lindsburg, Kansas 67456
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## CENTRAL OHIO CONSORTIUM FOR COMPUTER SCIENCE

TARGET AUDIENCE: Computer science faculty.

AWARD: Grant G0082-01462 10/11/82 - 9/30/85 Cost: $215,000

The Central Ohio Consortium has been established for the purpose of utilizing the expertise and resources of the Department of Computer and Information Science at the Ohio State University to improve the preparation of computer science instructors and the corresponding development of computer science curricula in postsecondary computer science education at the eight universities and colleges in the Central Ohio region: Capital University (Columbus, Ohio), Denison University (Granville, Ohio), Franklin University (Columbus, Ohio), Keyon College (Gambier, Ohio), Ohio Dominican College (Columbus, Ohio), the Ohio State University (Columbus, Ohio), Ohio Wesleyan University (Delaware, Ohio) and Mount Vernon Nazarene College (Mount Vernon, Ohio). The objective of this project is to assemble a core of faculty at each member institution which is up to date with current computer science concepts and technology. It is felt that a successful achievement of this objective can serve as a model, for nearly every postsecondary institution in the country is presently short of well-trained computer science faculty.

MAJOR PRODUCTS: Model of Inter-Institutional Cooperation.

PROJECT DIRECTOR:

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Acting Chairman of Computer and
Information Science
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Columbus, Ohio 43212
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## II. COMPUTERS AS INSTRUCTIONAL AIDS FOR STUDENTS

A. Computers as Basic Communication Aids for the Disabled
  1. Visually impaired
  2. Non-vocal
  3. Severely physically impaired
  4. Multiply handicapped

B. Computers as Learning Aids
  1. Multiple Content Areas
  2. Basic Skills
  3. English Language Arts
  4. Foreign Languages
  5. Math
  6. Math/Science
  7. Science
  8. Social Sciences
  9. Fine Arts
  10. Business/Technical Education
  11. Student Counseling

# TECHNOLOGY COMPENSATORY ACTIVITIES

TARGET AUDIENCE: Severely visually-impaired persons

AWARD: #300-83-0268 9/30/1983 to 3/30/1984 Cost; $207,777

Historically, laboratory work has presented a major impediment to visually impaired college students who plan to pursue careers in scientific or technical fields. Chemistry is certainly a formidable barrier, but it is one that must be surmounted because chemistry courses are a required part of the curriculum in all the natural sciences, in every branch of engineering, and in most of the health professions. Almost nothing has been done to adapt college level chemistry courses to the needs of visually impaired students. Visually impaired students have avoided (or have been counseled away from) the scientific and technical disciplines which require chemistry courses. The scientific community has recently become sensitive to the fact that disabled people, especially blind people, are grossly under-represented in science and engineering. Morris Sica reports that about 15% of blind undergraduates surveyed seek degrees in scientific and technical fields (about 20% for sighted students). Sighted laboratory aids make visual observations and perform manipulations the visually impaired student cannot perform. Sighted aids often step outside their proper role as sensory extensions and become active participants in the intellectual process, volunteering gratuitous interpretations of what they see...they deprive the visually impaired student of the opportunity to draw independent conclusions from the observation.

A larger measure of independence in the laboratory can be attained using adaptive apparatus that can be operated by the visually impaired student without assistance. (There is a trend in natural sciences and engineering toward instrumental measurements and away from direct visual observation.) The ultimate laboratory aid for the visually impaired person would be a portable talking laboratory computer. Such a computer would accept input from almost any scientific instrument and convert it to speech; it also could provide spoken instructions, perform calculations, exercise control over external devices, and communicate with other computers to function as a talking terminal. Our goal is to lower barriers which discourage visually impaired students from seeking scientific and technical careers and to provide a tool that could be used within almost any standard laboratory course in chemistry. The device has the potential for use in both secondary schools and college level physic laboratories.

MAJOR PRODUCTS: Field testing universal laboratory training and research aids. If annual sales of 12 units occurs, this education aid would cost approximately $8,500 each to consumers.

PROJECT DIRECTOR:

David Lunney
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## A PROJECT TO MAKE APPLE COMPUTERS ACCESSIBLE TO BLIND CHILDREN

TARGET AUDIENCE: Blind students.

AWARD: Grant #G00-83-00349 8/01/1983 to 7/31/1984 Cost: $50,135

The purpose of this proposal is to provide available educational software through speech synthesizers and modification for blind and visually impaired students. It is anticipated that the software development program will produce the necessary adapted material that can easily be used "in the general realm of education for the visually impaired."

MAJOR PRODUCTS: Adapted instructional software

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Susan Philips<br>Sensory Aids Foundation<br>399 Sherman Avenue<br>Suite 12<br>Palo Alto, California 94306<br>(415) 329-0430 | James L. Hamilton<br>Office of Special Education and Rehabilitative Services<br>Special Education Programs<br>Division of Educational Services<br>Research Projects Branch<br>400 Maryland Avenue, S.W.<br>Washington, D.C. 20202<br>(202) 732-1110 |

## SENSORY AIDS FOR THE BLIND

TARGET AUDIENCE: Special education teachers, vocational counselors, physicians and therapists, manufacturers and blind persons/parents.

AWARD: Grant #G00-83-05054 7/01/1980 to 6/30/1985
Cost $2,750,000

Among other things the Smith Kettlewell Institute has developed the following sensory guides for persons with visual impairments:

1. The Computerized University Tone Indexer is used to superimpose a normally inaudible tone into material which is being tape recorded. The tone can be heard during fast scanning of the tape. In this way, the device can be used to mark by portions of the tape for future reference.

2. The Talking Signs system makes street signs, bus identification signs, home addresses, etc., available to blind, visually impaired and reading impaired persons by storing a spoken message on a computer chip which is activated by pointing the receiver in the general direction of the sign.

3. Auditory Arcade - Because most of the computerized electronic games have visual displays, they are not usable by blind children. The computerized Auditory Arcade is fun to use and educational. It provides three different games and three different skill levels; and the interchangeable Playing Panels represent different game sets. The Playing Panels make the Auditory Arcade a modular device with the potential to provide an essentially unlimited number of different game sets and types of tasks. Thus it is possible to fabricate a custom-designed Playing Panel to meet the specific needs of any particular user. For example, the Match-Maker Panel displays 16 different fabrics for texture-matching, but new stimuli can replace these fabrics because they are attached to the plug surfaces via Velcro. Raised geometric shapes, braille, and colors would all be suitable stimuli. In fact, instead of simple one-to-one matching, this Panel could actually be used for more abstract concepts such as pairing opposites, mirror images, etc.

4. Beep Ball - This educational/recreational project developed remote controlled base markers for Softball adapted for the blind.

MAJOR PRODUCT:

PROJECT DIRECTOR:

Arthur Jampolsky
Smith Kettlewell Institute
of Visual Sciences
2232 Webster Street
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(415) 563-2323

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# RECOGNITION OF CHILDREN'S SPEECH PATTERNS

TARGET AUDIENCE: Handicapped and non-handicapped children

AWARD: Contract 400-83-0034 10/1983 to 4/1984 Cost: $38,668

There are two general types of speech recognizers available for use with children: speaker-independent systems with a limited vocabulary designed for use with computer games, and speaker-dependent devices with larger vocabularies that must be "trained" by users. Neither is adequate for educational use because they don't pay adequate heed to children's special speech characteristics.

The objective of this research is to develop a software-based, speaker-independent speech recognizer that forgives errors of pronunciation and is tailored to children's voices. Initially recognizing 50-100 words, the system would eventually accommodate a much larger vocabulary and have the capacity of "learning", i.e., of improving its performance through "experience" with various speakers and in various noisy environments. The techniques to be researched combine existing state-of-the-art recognition techniques with innovative modifications for speech analysis and approximation, based on original concepts for processing speech.

MAJOR PRODUCTS: A speaker-independent, speech learning system suitable for use in educational environments by handicapped and non-handicapped children.

Potential commerical applications include aids for the handicapped, peripherals for educational computers, and speech therapy tools. Both in and out of the classroom, speech control of other processes and speech-to-text conversion are envisioned.

PROJECT DIRECTOR:

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## UNIVERSAL COMMUNICATION SYSTEM FOR SEVERELY IMPAIRED NON-VOCAL PERSONS

TARGET AUDIENCE: Special education teachers, vocational counselors, therapists, manufacturers and handicapped persons/parents.

AWARD: Grant #G00-80-03004 2/01/1983 to 1/31/1988 Cost: $175,000

This project is conducted under a grant from the National Institute of Handicapped Research to establish and operate a Rehabilitation Engineering Center with a major research program entitled "Quantification of Human Performance."

Particular emphasis for this project centers on the design and development of a universal communication system (UNICOM) which is intended to provide control by severely impaired non-vocal persons by automatically accommodating to a wide range of interface devices which allow access to synthetic speech systems, computers, print systems, etc. Clinical evaluation of these systems has created a demand which should accelerate technology transfer.

MAJOR PRODUCT: A universal communication device interfacing system.

PROJECT DIRECTOR:

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Children's Hospital Medical Center
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## COMMUNICATION AIDS FOR NON-VOCAL PERSONS

TARGET AUDIENCE: Special educators, non-vocal handicapped persons/parents, physicians and therapists and manufacturers.

AWARD: Grant #G00-83-0073 2/01/1983 to 1/31/1988 Cost: $1,500,000

The research being conducted at this Rehabilitation Engineering Center addresses the severe problems created by limitations in expressive communication. It deals with the development of new engineering concepts, systems and devices to improve the ease, scope and efficiency of communication and through this, the quality of life.

In all, fourteen research and several educational projects have been funded to investigate different aspects of the problem. The area of non-vocal communication continues to be the major thrust. It focuses on instrumentation design and scientific investigation. The issue of developing appropriate interfacing strategies to maximize a client's available motor skills is inseparable from the need to better understand these motor skills. Studies in the linguistic variations of non-speech language combine with the interfacing research to offer insight into the question of rate and fluency. All of these are vital to the effective design of communication systems that can be used to the fullest extent of a client's personal abilities.

MAJOR PRODUCTS:

1. Development and evaluation of a computerized Visual Line of Gaze Communication System for Severely Disabled.
2. Development and testing of an Ocular Interface for Commercial Microcomputers.
3. Microprocessors/computer Based Control Interace.
4. Machine Recognition of Dysarthric Speech/Sounds: Character Recognition Using Anticipation.
5. Evaluation of the Effects of Seating on the use of Communication Interfacing Devices.
6. Language Processing by the Developmentally Non-Speaking.
7. Development of a Direct-Selection Communication Device to Implement SPEEC and PRE-SPEEC Communication System.
8. Computer Language for Communication Systems Design: A Project in Development and Dissemination.
9. Investigation of a Transition Preserving Diphone Method of Speech Synthesis.

PROJECT DIRECTOR:

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## TECHNOLOGY COMPENSATORY ACTIVITIES

TARGET AUDIENCE: Severely physically-impaired persons.

AWARD: #300-83-0283 9/30/1983 to 3/30/1985 Cost: $121,051

Severely physically impaired, school-age children are being excluded from the educational process. Generally, these children are present in the classroom but, it is their inability to communicate effectively and to interact with the educational environment that puts them at a disadvantage. Because they cannot speak and are physically impaired to the degree to be unable to use writing, typing, sign language or gestures, these children can excel educationally only with appropriate aids. Until now, no system offers a totally integrated control of communication, mobility, and computer access. Educational barriers to all subject areas exist for lack of an integrated expressive system which allows active rather than passive role in the education process.

To address this problem, communication, mobility, and computer access will be provided by a core component: an expressive communication aid. Mounted on a powered wheelchair, a selection technique will allow the student to control the wheelchair, transmit wireless data to a computer having a keyboard emulator, as well as provide artificial voice and visual display of speech for the non-vocal user. A portable computer will provide a mobile note taker and buffer to the remotely located education computers used by the student.

MAJOR PRODUCTS: A field tested motorized wheelchair, communicator, portable computer, wireless linker, and special interface board unit. The estimated consumer cost would be $14,000 to $15,000 based on annual sales of 100 to 500 units. A report will also document marketing-plan recommendations and detailed specifications of the education-aids devised.

PROJECT DIRECTOR:

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## TECHNOLOGY COMPENSATORY ACTIVITIES

TARGET AUDIENCE: Severely physically-impaired persons.

AWARD: #300-83-0269 9/30/1983 to 3/30/1985 Cost: $141,361

The potential use of the microcomputer as a tool and as a learning aid is denied to many physically handicapped children for lack of a viable means to access the keyboard. Children who cannot use a microcomputer keyboard are then blocked from access to the large library of educational, home, and business software which exists. Yet this is a population which can benefit most from using such a software library. Educational software can be the window for handicapped people to experience and learning which are otherwise unattainable. Software offers new capabilities for the handicapped to take control of parts of their lives and become more creative and productive people. To date, software for special needs students has been limited to specially developed software with special keyboards and prosthetic devices. This is very limiting in terms of available software and very expensive.

To address this problem, a general purpose adaptive interface unit must be developed to provide those students access to software designed to run on the Atari, Commodore 64, Apple II Plus, Apple IIe, and IBM PC microcomputers. Everything that is special about a particular user will be contained in the interface itself; and application software can be run without modification. Develop hardware needed to combine with commercial peripherals to activate and link-up the adaptive interface; write software to allow the adaptive interface to operate; and market low-cost interfaces to potential users.

MAJOR PRODUCTS: Field tested components of host add-ons for computers will be used in creating the aids to be delivered at contract-end to the Government after field-testing. If annual sales of 125 units occur, the education aid's host add-on would cost approximately $657 each to consumers. A complete Apple-based system would be $3,157 each if 125 units are sold. A report will document recommendations and detailed specifications for the market-plan.

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## TECHNOLOGY COMPENSATORY ACTIVITIES

TARGET AUDIENCE: Severely physically-impaired persons.

AWARD: #300-83-0267 9/30/1983 to 3/30/1985 Cost: $149,773

For a large number of physically handicapped, the inability to write effectively has severely hampered, if not prevented, meaningful participation in the education program in which they have been placed. Relatively little attention has been paid to providing physically handicapped individuals who are unable to use standard pencil and paper with any alternative. Further, incorporation of computers into the educational system may in fact aggravate rather than alleviate the problems of these individuals, many of whom are unable to use the standard computer hardware and software which is rapidly being incorporated into the educational process.

This problem will be addressed by careful selection and configuration of commercially available hardware and selected existing software to form a relatively low-cost, compact and portable writing/conversation/computer-access unit. The unit, which would be small enough to be carried by ambulatory as well as wheelchair-bound individuals, would be capable of providing the basic pencil and paper functions for individuals with a very wide range of physical handicaps. In addition, the aid will provide the ability to use standard computers through available keyboard emulators, and provide complete access for severely handicapped individuals to all standard keyboard-based software without requiring any modification to the standard software programs.

MAJOR PRODUCTS: Field tested voice synthesizers, microcomputers, keyboard emulator parts, etc. will be developed. The end-product is estimated to cost consumers $1,000-$1,200 based on annual sales of 100 to 1,000 units. Estimated sale for units would be 100-200 in year 1, 300-500 in year 2, and 600-plus in year 3. A report will contain marketing-plan recommendations as well as the detailed documentation of the education-aids devised.

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# DEVELOPMENT OF A COMPUTER-ASSISTED PROOFREADING SYSTEM FOR THE HANDICAPPED

TARGET AUDIENCE: Handicapped individuals

AWARD: Contract 400-83-0035 10/1983-4/1984 Cost: $39,162

A growing national need exists for computer work stations which integrate manual data base preparation functions for increased accuracy, control and productivity. These work stations could incorporate disabled individuals suffering from a variety of handicaps into the work process.

The research is directed toward developing better use of computer technology in the education, training, and placement of handicapped individuals. Specifically, a more accurate manual data input system for computer data bases is developed which will utilize the functional capacities of handicapped persons in the proofreading process. An investigation into the growing data base error problem indicates that the person/machine interface, hence accuracy, can be significantly improved by using an interdisciplinary approach.

Computer data base knowledge and science will be used with recent theoretical discoveries from optoelectronics and brain research to demonstrate the practicality of the approach.

This research is directed at improving the methods used in manual data base preparation so that accuracy and speed are increased. Such methods have universal application commercially with the increasing availability of computers and the trend toward development of distributed networks, where data entry is performed by end users and clerks who are not generally highly skilled in keyboard operations.

MAJOR PRODUCTS: A manual computer data input system.

PROJECT DIRECTOR:

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# TECHNOLOGY COMPENSATORY ACTIVITIES

TARGET AUDIENCE: Severely speech and vision impaired persons.

AWARD: #300-83-0271 9/30/1983 to 3/30/1985 Cost: $180,440

Those with visual handicaps so severe that they cannot read printed text or text displayed on a video screen and those with speech handicaps so severe that they cannot communicate in the classroom comprise smaller groups than the overall visually handicapped or speech impaired groups at large. But they present the most severe challenge to the educational system and involve the highest costs in terms of special education facilities and personnel. Large, fixed, plug-in computers have a number of disadvantages. The most important of which is that they cannot move from classroom to classroom or to home with a handicapped student. For speech handicapped students in higher grades and college, portability is essential. For the blind students a portable computer for note-taking and a fixed station for review, text-editing, and home work printout would be optimum. Unfortunately ready-made synthesizers are not available for any current brand of portable computer.

The project will make a prototype speech synthesizer with recently available speech chips, and have it put into production by one or more of a dozen synthesizer manufacturers. The contractor will buy two of the fixed-location computers (IBM PC and APPLE IIe) commonly used in schools plus one portable computer (TRS-80 Model 100). Speech synthesizers and special adaptations would be created for them combining existing software packages and hardware (to the extent it is suitable).

MAJOR PRODUCTS:

> Field tested speech synthesizers; and 20 software packages for use with the specified computers developed. The end-product is estimated to cost consumers $200 (for the portable model) if annual sales of at least 500 units occur. The computer itself, would be bought from a regular dealer for $2,000 with full set of peripherals and software. The table-top aid (IBM PC version) unit cost for the aid software accessory would be $150 if annual sales of at least 500 units occurs. The typical IBM PC would be $3,500 and speech synthesizer $199. The Apple II table-top version would be approximately $150 for the aid if at least 500 units are sold per year; the typical Apple computer would costs $2,500 plus $125 for speech synthesizer. A report will contain marketing-plan recommendations as well as the detailed documentation of the education-aids devised.

PROJECT DIRECTORS:

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## DEVELOPMENT OF A MICROPROCESSOR-BASED WORK STATION FOR SEVERELY AND PROFOUNDLY MULTIHANDICAPPED STUDENTS

TARGET AUDIENCE: Multi-handicapped Students

AWARD: Grant #G00-83-00312 7/01/1983 to 6/30/1984 Cost: $49,677

The purpose of this project is to demonstrate the utility of an instructional system for severely multiply handicapped children that utilizes a microcomputer-based work station. Activities that present pupils with opportunities to learn cause-and-effect relationships and to signal adults for attention will be provided by the workstation and associated software. "Manipulanda" and seating arrangements will be adapted to maximize each child's ability to interact with this equipment. Performance data will be collected for each child on each activity presented, and this data will be used to modify activities and equipment where needed. Data on child skills acquisition will also provide the basis for judgments as to the utility of this equipment. A manual for teachers will be developed to describe the use of the workstation and the activities which are available with it.

MAJOR PRODUCTS: A prototype work station, teacher's manual and evaluation reports

PROJECT DIRECTOR:

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## FUNCTIONAL ASSESSMENT AND TECHNOLOGY MATCHING FOR HANDICAPPED PERSONS

TARGET AUDIENCE: Handicapped persons/parents, special educators, physicians and therapists.

AWARD: Grant #G00-83-00077 2/01/1983 to 1/31/1988 Cost: $450,000

A major activity supported by the National Institute of Handicapped Research at Rancho Los Amigos Rehabilitation Engineering Center is Project Threshold. This project was designed to use microprocessors/computers to meet the unique needs of severely disabled clients who need assistance in performing tasks of daily living; assistance with management of attendant time and activities; and/or performance of school and job related tasks. The clients' needs are met by identifying problem areas and then working out solutions to the problems. This has become a model system for the delivery of rehabilitation engineering services and works closely with the Department of Rehabilitation and Training and California State Department of Rehabilitation.

Project Threshold has been involved in providing both direct services to clients and support services to rehabilitation counselors, clients and allied health professionals. These services offered have been divided into two areas: Independent Living/Home evaluations, and Functional and Site Assessment of School/Job.

In addition to these direct services, Project Threshold has provided additional support to rehabilitation counselors, other health professionals and consumers in the areas of education, information, dissemination, and consultation.

MAJOR PRODUCT: An assessment and equipment matching/prescription program for handicapped persons using IBM Personal Computers. Information on rehabilitation equipment available for handicapped persons/parents.

PROJECT DIRECTOR:

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# COMMUNICATION SYSTEMS FOR SEVERELY IMPAIRED PERSONS

TARGET AUDIENCE: Special education teachers, vocational counselors, physicians and therapists, manufacturers and handicapped persons/parents.

AWARD: Grant #G00-83-0045 2/01/1983 to 1/31/1988 Cost: $1,750,000

The purpose of this Rehabilitation Engineering Center is to overcome communication barriers. Communication barriers are not limited to conversational interaction, but extend to writing, access to information and data processing systems and control of essential devices and materials in the home, school and employment environments. Emphasis is placed on a balanced program between research, development/utilization, information dissemination and training.

The initial priorities for this Center are focused on: 1) Development of measurement system(s); 2) testing of measurement system(s) through comparative analysis of existing techniques; 3) providing access to existing hardware and software systems through simple modules and strategies; 4) assembling known information in this area into a clinically meaningful form to answer the deluge of requests for information; and 5) planning.

MAJOR PRODUCTS:

1. Development of an information transfer model and index for non-vocal communication aids and techniques.
2. Comparative analysis of existing physical interface techniques and aids in terms of bandwidth and required client abilities.
3. Enhancing optical headpoint performance levels through provisions of continuous feedback.
4. Effect of weighted position averaging feedback on pointing accuracy of individuals with athetoid movements or severe tremor.
5. Development of a systematic-data-based approach for individual clients.
6. Study of application of technology to facilitate communication in aphasic individual.
7. Study the design of software systems to facilitate access by handicapped individuals.
8. Study the access to television-based information system by handicapped individuals.
9. Development of computerized standard interconnection format for electrically controlled assistance devices.

PROJECT DIRECTOR:

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## COMPUTER ASSISTED INSTRUCTION MULTILINGUAL PROGRAM
## IRVINE UNIFIED SCHOOL DISTRICT

TARGET AUDIENCE: Limited English Proficient students in grades K-8 of various language backgrounds.

AWARD: Grant G00-83-01499 7/01/1983 to 6/30/1986 Cost: $870,000

The project will provide instruction to LEP students using computer assisted instruction and computer assisted TV. CATV will be provided primarily for oral language instruction in English as a Second Language. The use of a computer assisted TV approach will allow students to interact with the computer.

Computer assisted instruction will be provided for ESL oral English language arts, writing, literature, science, and math.

The project also plans to purchase and/or develop courseware in students' native languages for native language arts instruction.

The rationale for the interactive computer assisted TV is that the district needs to reach large numbers of LEP students of various language backgrounds who are geographically dispered.

The project students will also receive instruction in basic computer literacy.

The primary focus of the project is the development and delivery of services. The project uses the Apple IIE computer with 64K memory.

MAJOR PRODUCTS: Report of evaluation findings; handbook on using 2-way video systems; annotated list of courseware.

| PROJECT DIRECT: | ED. DEPT. CONTACT PERSON: |
|---|---|
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## PROJECT CABLE (COMPUTER-ASSISTED BASIC LEARNING EXPERIENCES)

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|---|---|
| TARGET AUDIENCE: | All learners and teachers/administrators, grades K through 12, with applications for students of all ability levels as well as in-service opportunities for teachers/administrators of all grade levels and content-areas. |

AWARD: Grant #G00-83-03403 1/01/1984 to 12/31/1985 Cost: $137,052

The purpose of Project CABLE is to research, develop, test, demonstrate, and disseminate innovative/exemplary uses of microcomputers (and support technologies) for the improvement of instruction in reading, writing, mathematics, science, and other curricular areas. More specifically, the project seeks to design microcomputer-assisted curricula that is Science of Teaching-based and that will impact the greatest numbers of students using the minimum number of microcomputers for economy of operation. Visitors to the Project CABLE demonstration site will be afforded year round in-service training and classroom visitation opportunities conducted by practicing, computer-competent classroom teachers, featuring hands-on learning experiences.

In-service training in the effective and economical use of microcomputers is the central focus of Project CABLE. Structured workshops featuring outstanding educators in the field of computer-assisted instruction will be conducted and advertised for open admission. Also, the Project CABLE staff will respond to individual school and district requests for visitations and tailor a visitation agenda to meet the needs of the visitors including a specific personnel match; i.e., secondary level content-area teachers will be scheduled to visit classrooms and teachers engaged in microcomputer- assisted instruction in their fields of interest. In addition to core curricular areas, microcomputer-assisted components are available for visitation in such curricular areas as Chapter 1, special education, drop-out prevention, summer school curricula, robotics, parent/patron classes, and for visitors to Project READ:S, a National Diffusion Network (NDN) reading skills program.

| | |
|---|---|
| MAJOR PRODUCTS: | Samples of project-developed microcomputer software and implementation guides |
| | In-service training materials |

PROJECT DIRECTORS:

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# PROJECT BILINGUAL EDUCATION AUTONOMOUS LANGUAGE LEARNING

TARGET AUDIENCE: Limited English Proficient students in grades 1-9 whose native language is Spanish.

AWARD: Grant G00-81-02140 9/01/1981 to 8/31/1984 Cost: $727,679

The purpose of the project is to assist LEP students to improve their English proficiency. Computers are used to provide instruction in English language arts, reading, math, and science. The project is pilot testing CAI materials in these curricular areas.

The computer is used mainly in drill and practice modes to reinforce concepts learned in the classroom. The courseware includes lessons in both Spanish and English.

Parents of the participants receive instruction in basic computer programming and learn about the use of the computer as an educational tool.

Staff are provided inservice training in courseware development.

The project uses TRS-80 microcomputers.

MAJOR PRODUCTS: Informational brochure and report of evaluation findings.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Gladys Pena<br>New York City Building of Education<br>C.S.D. #28<br>70-48 Austin Street<br>Forrest Hills, New York 11375<br>(212) 830-3230 | Cindy Ryan<br>Office of Bilingual Education and Minority Language Affairs<br>Reporters Building, Room 421<br>400 Maryland Avenue, S.W.<br>Washington, D.C. 20202<br>(202) 447-9227 |

# BILINGUAL EDUCATION AND THE ENHANCEMENT OF ACADEMIC ACHIEVEMENT
(Tempe, Arizona)

TARGET AUDIENCE: Limited English Proficient students in grades 4-6 whose native language is Spanish.

AWARD: Grant G00-83-02197 8/01/1983 to 7/31/1986 Cost: $240,000

The purpose of the project is to develop, implement, and test a microcomputer assisted curriculum which will include instruction in Spanish language arts, English language arts, computer literacy, and math. Achievement of project students will be compared to achievement of comparison group students who are receiving a similar curriculum, without the benefit of CAI.

Instructional staff will receive training in CAI, CMI, and computer literacy.

Parents of participants will receive basic computer literacy training.

Project will utilize the Apple III MCAI system.

MAJOR PROUDCT: Program Brochure Evaluation Report

PROJECT DIRECTOR:

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# KENTUCKY SCHOOLS TECHNOLOGIES PROJECT

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|---|---|
| TARGET AUDIENCE: | Average learner in middle school grades (5-6) with appropriate applications for rural educationally handicapped, gifted, and culturally diverse children from the rural isolated school district. |

AWARD: G00-83-03613 12/22/1983 to 12/31/1985 Cost; $141,003

It is the purpose of this project to develop and demonstrate an interactive network using microcomputers owned by school districts, and a university mainframe (virtual IBM 4341) computer. These computers are to be connected by a local television cable system and/or the state owned and operated Kentucky Early Warning System (KEWS) which encircles the state. In consultation with representatives and teachers in ten schools (year one) from the 22 school districts of the Professional Development Center Network (PDCN), software will be identified and used to enhance instruction in reading, writing, mathematics, and science. University faculty members from the departments of English, physics, mathematics, computer science, and teacher education (reading, mathematics and science education) will serve as subject matter specialists to work with the teachers in selecting content software. In year two the expandability of the system will be examined to learn about the system's viability with teachers in training, handicapped students, the homebound, and groups of educationally disadvantaged students in isolated rural settings of the PDCN.

MAJOR PRODUCT: Interactive network.

PROJECT DIRECTOR:

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and
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## TECHNOLOGY APPLICATIONS IN BASIC SKILLS (TABS)

TARGET AUDIENCE: Teachers and students in grades 6 through 8 in junior high/middle schools in three Massachusetts communities. One of the schools will focus on the gifted and talented while other schools will focus on the average learner.

AWARD: Grant #G00-83-03405 10/01/1983 to 9/30/1985 Cost: $134,569

This project will develop or modify programs that use the microcomputer and related technologies to increase student competencies in the basic skills areas of writing, problem solving/science and research/study skills. It is also designed to develop procedures and programs that are compatible with and can serve as a model for a district's total technology application endeavors.

The project is being implemented in three school districts at grades 6 through 8 with each school applying technology to a specific basic skill area. The schools will adopt a national validated program or revise their existing curriculum to incorporate the use of technology. Training will be provided to teachers in the use of technology, program development, and implementation services.

The project is designed to yield benefits on the effective use of educational technology for school improvement at three levels:

- Teachers and students will develop new skills and competencies in computer utilization; students will improve their basic skills in the areas of writing, problem-solving, science and research/study skills.
- All district staff will have a model to use in developing a district-wide computer instructional plan.
- The integration of computer technology into the total curriculum will support school improvement efforts in the area of basic skills.

MAJOR PRODUCTS: An implementation guidebook on how technology can be integrated into the curriculum of basic skills. Teacher training syllabi in the three skill area.

"Courseware" or "Trainware" developed or modified for technology applications.

PROJECT DIRECTOR:

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# DEMONSTRATION PROGRAM OF INSTRUCTIONAL TECHNOLOGY

TARGET AUDIENCE: Limited English Proficient students in grades 9-12 whose native language is Arabic.

AWARD: G00-82-02185 10/01/1982 to 9/30/1985 Cost: $600,000 for a 3-year period

This project will develop and disseminate a technologically supported supplementary program for LEP high school students. The project will develop, field test and evaluate technological support learning units (telemodules for cable TV) and CAI packages in both survival skills and in academic and vocational areas.

CAI packages will be developed for use with AR-Apple microcomputers. Cable TV telemodules will be developed for use with the Telepromoter Corporation Services provided to Dearborn Public Schools.

MAJOR PRODUCTS: CAI packages for AR-Apple Microcomputer
Cable TV telemodules

PROJECT DIRECTOR:

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# MESA LANGUAGE IMMERSION PROGRAM

| | | |
|---|---|---|
| TARGET AUDIENCE: | Adult English as a Second Language students, basic level and more advanced. | |
| AWARD: | 7/1983 to 6/1984 | Cost: $9,590.00 |

The overall project objective is to use district owned computer centers to provide a program of computer managed instruction for English as a Second Language, ESL students enrolled in adult education programs.

The Gould-Hoffman XL centers will be used to:

- Increase the individualization of instruction for adults.
- Provide a balanced curriculum allowing instructors to present skills sequentially or in singular focus.
- Motivate students through an active learning environment built around interesting and enjoyable materials.

MAJOR PRODUCT: Development of compatible curriculum and testing materials.

PROJECT DIRECTOR:

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# ADULT COMPUTER-BASED EDUCATION (ACE)

TARGET AUDIENCE: Adult education students, all educational levels and ages.

AWARD: 9/01/1983 to 6/30/1984 Cost: $29,910

Project objectives are:

1) To pilot a computer-based education program in adult education that will serve as a model for possible adoption by similar programs throughout the state.
2) To increase special emphasis on Individually Prescribed Instruction (IPI) and incorporate Adult Performance Level (APL) objectives into the lesson resources.
3) To significantly increase participation by adults in the program through ACE.
4) To provide a more comprehensive educational delivery system for reaching adults who are least educated and in the greatest need of assistance.
5) To reduce the illiterate population of the parish.
6) To significantly increase the number of GED graduates.
7) To establish a model for incorporating a computer literacy program into the adult education program for the possible adoption by similar programs.
8) To collect and evaluate data on student acceptance of the pilot project.

In order to provide a more comprehensive program for adults, this project will provide for the purchase of microcomputers and appropriate courseware which will be competency and mastery based, emphasizing individualized prescriptive instruction and incorporating APL objectives. It will also include computer literacy as part of the standard curriculum for adult education classes.

Project effectiveness will be determined at the end of the project through the compilation of statistical data and staff observations and records.

MAJOR PRODUCT: Final project report.

PROJECT DIRECTOR:

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## COMPUTER BASED INSTRUCTION (CBI) DEVELOPMENT

TARGET AUDIENCE: Appalachian community college faculty and students.

AWARD: G00-82-02967 10/01/1982 to 9/30/1986 Cost: $138,100

The purpose of this activity is to develop an adaptable, versatile, and mobile system for utilzing computers in the instructional and student development programs. With a hardware system of twelve microcomputers and a hard disc capability, usage can vary from independent use of one micro to a use of the whole system. Prime benefits are: assisting the development of computer literacy for faculty and students; providing individual instruction and drill practice; alleviating math and computer anxiety; allowing simulated experiences; and aiding instruction for test performance. To gain these benefits, the activity concentrates in one year on computer literacy for interested faculty and administrators, integrating computer modules in the learning resource laboratory, and developing faculty--counselor relationships for the CBI's student development modules. With a basis authoring program and assistance of a full-time CBI coordinator, seven faculty each summer are adapting existing software for their instructional needs. Software for student skills and experiment simulations are purchased from vendors. The second year of development provides testing of the new software and the faculty-counselor responsibilities for CBI to meet the deficiencies in student skills.

MAJOR PRODUCTS:

- System for faculty and counselors to offer CBI for student skills.
- Seven academic courses with CBI components each year.
- System of microcomputer hardware.
- Authoring program for developing software in-house.

PROJECT DIRECTOR:

N. Dewitt Moore
Virginia Highlands Community College
P.O. Box 828
Abingdon, Virginia 24210
(703) 628-6094

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## COMPUTER ASSISTED LEARNING LABORATORY (C.A.L.L.)

TARGET AUDIENCE: Technical college students and faculty.

AWARD: G00-83-02650 10/01/1983 to 9/30/1986 Cost: $170,374

### Activity I. Establishment of a Computer Assisted Learning Laboratory (C.A.L.L.)

The activity aims at the establishment of a C.A.L.L. to be promoted as an aid to the different areas of instruction as well as for the institution faculty computer literacy program.

Title III strengthening program Part A funds will be allocated to the task of organizing and establishing the hardware system, to develop the Library of Computerterized-Video remedial instruction in Mathematics Logical Thinking, English and Spanish. It is part of the plan to diffuse and incorporate the system as a normal component of everyday learning.

### Activity II. Computer Assisted Administrative Procedures and Data Base

This activity consists of the computerization of the operations related to student admission and registration. The computerization of these processes, that as of now are done manually, will help the institution move toward self-sufficiency. The computerization of these processes will not only help lower costs of operation, but will also improve planning administration.

MAJOR PRODUCTS: Computer assisted learning laboratory and computerized administrative procedures.

PROJECT DIRECTOR:

Gaddiel Morales Burgos
Technological College of the
Municipality of San Juan
Jose Oliver Street
Hato Rey, Puerto Rico 00918
(809) 753-6121

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## NORTHERN ESSEX COMMUNITY COLLEGE--INTERACTIVE LEARNING: INSTRUCTIONAL DESIGN AND STAFF DEVELOPMENT

TARGET AUDIENCE: Students, faculty and staff, of Northern Essex Community College.

AWARD: G00-82-202 10/01/1982 to 9/30/1987 Cost: $350,000

This activity is designed to infuse into several curricula a supplementary instructional mode designed to reduce learner frustration, lower attrition rates, and increase faculty members' success in meeting individual student needs. Over a four-year period, a minimum of thirty faculty will have an opportunity to develop and utilize computer assisted/interactive video instruction tailored to their respective program areas. Cost effective self-paced packages will be developed for use in both classrooms and industrial settings.

The long term objectives of the activity focus specifically on achieving self-sufficiency in the area of interactive video tape production and maximizing the use of its component parts, microcomputer and video tape, on an institution wide basis. The implementation strategy emphasizes: 1) staff development, 2) production, and 3) long term stability in the development of computer assisted and/or visual instructional materials.

MAJOR PRODUCTS: Self-paced computer assisted/interactive video instruction packages

PROJECT DIRECTOR:

Wendy Shaffer
Title III Coordinator
Northern Essex Community College
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Harverhill, Massachusetts 01830
(617) 374-0721

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## YORK COLLEGE--DEVELOPMENT OF INSTRUCTIONAL USE OF COMPUTERS

TARGET AUDIENCE: Students attending York College of the City University of New York.

AWARD: G00-82-02239 10/01/1982 to 9/30/1984 Cost: $131,528

The major problems preventing York College from implementing computer-based instruction include fiscal constraints, lack of Computer Assisted Instruction computer facilities, lack of familarity of faculty with both computer technology and existing CAI software, and lack of time of faculty to develop computer based-instruction. Courses targeted for use of CAI materials have been identified by each major academic department: English, Philosophy, Accounting, Education, Business, Sociology, Music, Speech, Fine Arts, Physical Education, etc. Each objective will be achieved in part by successfully introducing CAI programming in specific chosen courses, or by developing the required resource facilities for computerized instruction. York College recognizes the need for faculty training relating to availability of appropriate technology, determination of areas most applicable for adoption of CAI in academic courses, and methods of operation of systems.

MAJOR PRODUCTS: Report of activities

PROJECT DIRECTOR(S):

Che-tsao Huang
York College of CUNY
Center for Educational Technology
150-14 Jamaica Avenue
Jamaica, New York 11451
(212) 969-4212

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## DEVELOPMENT OF MICROCOMPUTER ASSISTED INSTRUCTIONAL CAPABILITIES IN SCIENCE, READING, ENGLISH, AND MATHEMATICS

TARGET AUDIENCE: Students in four-year colleges who need tutorial assistance with English and math skills.

AWARD: G00-82-02557 10/01/1982 to 9/30/1987 Cost: $72,735

The major goal of this Title III, Part A, activity is to develop microcomputer assisted instructional capabilities to assist the college to improve the quality and quantity of its graduates and reduce the current rate of attrition.

The English, Math, and Science Departments have developed an interdisciplinary approach to computer-assisted instruction. The institution has developed two learning centers for microcomputer-assisted instruction. These centers provide a facility for tutorial assistance in science, reading, English, and mathematics. The initial effort in science will be restricted to physics in order to concentrate on solving the problems in one discrete area. It is projected that the final phase of developing this aspect of the project will extend the effort to chemistry and biology. The areas of reading, English, and mathematics will be developed simultaneously through an interdisciplinary approach. The learning centers will provide the use of microcomputers to satisfy a real educational need in self-paced individualized instruction.

MAJOR PRODUCTS:

6 32K 4032 PET microcomputers
1 Mannesmann Talley 8024 Printer
1 CBM C2M Cassette Drive
1 Coruus Winchester Disk

PROJECT DIRECTOR:

Joann G. Boyd
Title III Coordinator
South Carolina State College
College Avenue
Orangeburg, South Carolina 29117
(803) 536-7000

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## MUNDELEIN COLLEGE--DEVELOPMENT OF AN ACADEMIC COMPUTER CENTER, A COMPUTER SCIENCE PROGRAM AND COMPUTER-ASSISTED INSTRUCTION

TARGET AUDIENCE: Strengthen the instructional facilities with an Academic Computer Center. More traditionally aged students to be added or retained.

AWARD: G00-82-02945 10/01/1982 to 9/30/1985 Cost: $243,504

To develop an Academic Computer Center and a quality program in computer science that will meet student demand. The College plans to increase course offerings in computer science and to increase the application of computer science in business, social sciences and communication.

To introduce computer-assisted instruction into at least eight academic departments and provide opportunities for all students to develop computer literacy and to develop more effective academic skills related to various liberal arts disciplines.

Implementation strategies are of four types: 1) acquiring facilities and computer hardware and software, 2) faculty development, 3) curriculum development, and 4) support services for academic computing.

MAJOR PRODUCTS: Academic Computer Center, increased number of terminals, software provided for computer-assisted instruction, training workshops for faculty on the application of computers to instruction development of new courses, increase in the number of graduates having taken computer science and computer-assisted instruction.

PROJECT DIRECTOR:

Margaret Healy
Mundelein College
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Carlos Stewart
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## COMPUTER UTILIZATION IN EDUCATION (PROJECT CUE)

TARGET AUDIENCE: Teachers of students grades 3-8.

AWARD: Grant G008301139 11/1/83 to 10/31/87 COST: $43,033 (first year)

Project CUE's overall goal is to increase student achievement in reading and mathematics through use of the microcomputer as an integral part of the instructional and management processes. CUE is a sequentially organized, criterion-referenced reading and mathematics curriculum which can be adapted to incorporate both a state syllabus and local curriculum objectives. Criterion-referenced objectives are correlated with the skills continuum of commercially developed, computer-assisted, instructional programs and other commercial materials. The CUE curriculum includes assessment techniques which may be utilized for the purposes of student diagnosis, placement, and instructional management.

Students are scheduled to use the computer daily for instruction for approximately 15 minutes per session, 75 minutes weekly. Teachers, administrators, and support staff utilize the microcomputer to access student records (criterion-test results and computer-managed instruction test results) to monitor and assess student progress. These records can be viewed on a terminal or produced as a printout. Keeping the equipment in a laboratory setting allows flexibility in teacher-student scheduling and permits additional classroom coordination in the use and development of microcomputer instructional materials which correlate to the project-developed reading, mathematics, and computer-awareness curricula.

Approved by the Joint Dissemination Review Panel, CUE has received dissemination funds from the National Diffusion Network to make public and nonpublic schools, colleges, and other institutions aware of what CUE offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. Installation costs vary greatly, depending on equipment needs, commercial software purchased, and the degree of implementation a district desires.

PROJECT DIRECTOR:

Carol Heiselman
Central Square Central School
 District
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ED. DEPT. CONTACT PERSON:

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For related Chapter I support:
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79

# COMPUTER-AIDED INSTRUCTION IN EDUCATION BASICS FOR INDIAN STUDENTS

TARGET AUDIENCE: American Indian students in elementary schools

AWARD: G00-82-01452 10/01/1982 to 6/30/1985 Cost: $403,319

This project is designed to adopt, develop and evaluate computer aided instructional materials in elementary education basics, specifically word recognition, reading comprehension and math. Benefits are easy replication and the tailoring of the materials specifically and in detail to help individual students.

Phase I of the project is for planning and design work, Phase II is to develop and evaluate materials specified in Phase I, and Phase III is to demonstrate and evaluate the transportability of the materials.

MAJOR PRODUCTS: Computer-aided courseware in reading and mathematics.

PROJECTS DIRECTOR:

M.L. McNamara
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Provo, Utah 84601
(801) 224-6400

ED. DEPT. CONTACT PERSON:

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# COMPUTER-ASSISTED DIAGNOSTIC-PRESCRIPTIVE PROGRAM IN READING AND MATHEMATICS (CADPP)

TARGET AUDIENCE: A reading program for grades 3-9 and a mathematics program for grades 3-7 with special focus on educationally disadvantaged students.

AWARD: Ongoing as of 1983 and funded through the State via ECIA Chapter I

CADPP was developed as a response to the SRA test scores of Buckingham County Public Schools' educationally disadvantaged students, which showed an annually increasing gap between normal expected growth and actual growth. The resulting resource laboratory program combined with a computerized information retrieval system allows for accurate diagnosis of a child's needs in reading comprehension and mathematics computation and provides the teacher with prescriptions (materials and methods) that help in meeting those needs.

A locally developed battery of standardized criterion-referenced tests is used for diagnosis and evaluation. The computer system prescribes learning activities based on individual achievement levels, learning modalities, and interests; channels students to the learning centers; tracks progress to ensure that prescriptions are not repeated; and maintains continuous progress reports for the students, teachers, and parents. The program has been approved by the Joint Dissemination Review Panel.

MAJOR PRODUCTS:
- Computer System
- Software
- CADPP Criterion-Referenced Tests
- Awareness Materials

PROJECTS DIRECTOR:

Debra J. Glowinski
Federal Programs Director
Chapter I Office
Box 292
Dillwyn, Virginia 23936
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ED. DEPT. CONTACT PERSON:

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## DIDATIC PROCESSING SYSTEMS (DPS)

TARGET AUDIENCE: Elementary and secondary level students

AWARD: Contract 400-83-0008 (Part of the Laboratory NIE budget)

Didactic processing systems (DPS) are instructional tools that are computer-driven but outside the tradition of computer-assisted instruction. In conventional CAI, software winds a student through multi-layers of networks, all movement triggered by a student's responses at any one layer. In CAI, the computer conventionally displaces the instructor in providing either a tutorial or drill. DP systems rely on a very different pedagogical logic.

Didactic processing systems are a hybrid of word processing and electronic games. The systems do not teach new skills, but rather apply, extend, and sharpen basic skills that students have already learned in classroom instruction. DP systems deal directly with aspects of instruction that are recognized as important but are usually treated indirectly, if at all, instructionally--matters of application, problem solving, transfer of training, trouble shooting, creativity. With a DPS, learners are not "guided through" anything, rather they move themselves through their activity by using the data bases and software of the DPS that supports their learning to "do a job." With a DPS, the student, not the software, is in control. Students can "go" wherever they like rather than to where the software "takes" them.

A DP system uses microcomputers for what they do best, information retrieval and processing--not information retrieval and processing on just any topic, but rather on fundamental objectives of elementary schooling. From the user's perspective, there is noting "complicated" about a DPS. The DPS datapak/software is completely self-contained and self-explanatory, much like home video games. Sometimes a student needs only to query an existing data set in order to "learn" something. Other times a student will need to enter information and build a data set that is in turn organized/analyzed/interpreted by existing software. Existing data sets and software usually require some form of modification to "fit" the system.

It is anticipated that this development effort will conclude with studies and design of demonstration models for consideration by school districts and other potential adoptors.

MAJOR PRODUCTS: Design stage software for use with the IBM Personal Computer, Apple IIe, or Radio Shack computers.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Patricia Milazzo<br>Southwest Research Laboratory<br>Research Analysis Division<br>Los Alamitos, California 90720<br>(213) 598-7661 | Stephen Cahir<br>National Institute of Education<br>Program on Teaching and Learning<br>1200 19th Street, N.W.<br>Washington, D.C. 20208<br>(202) 254-5766 |

## COMPUTER-ASSISTED INSTRUCTION FOR THE MOST IN NEED

TARGET AUDIENCE: Rural Level 1 Adult Basic Education (ABE) students.

AWARD: TEC-11 July 1, 1982 - June 30, 1983 COST: $2,965

The ABE director will provide staff development to implement CAI with training on the Oregon Education Computer Consortium materials. Students will use the Minnesota (MECC) programs in reading, spelling, phonics and arithmetic to determine their appropriateness for adults. The project will use the Teacher Utility program to aid students tracking their own successes. Programs of increasing complexity and interest, including work in current events and social studies, will be available to the students. Specific objectives include: involving Level 1 ABE Adult Basic Education students in the instructional use of a microcomputer for basic arithmetic and language arts; motivating ABE students through successful use of computer-assisted instructional (CAI) materials in subjects requiring extensive practice and carefully move students toward knowledge areas such as social studies, science, and current events; and improving the efficiency of the ABE record keeping and report generating activity.

Pre and post tests will be used to measure achievement in basic arithmetic and language arts by the adults who use the microcomputer. A modified Focus of Control instrument will measure student attitude.

MAJOR PRODUCTS: A final evaluation report

PROJECT DIRECTOR:

Dick Gates
Director, Developmental Education
 Programs
Umpqua Community College
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(503) 440-4603

ED. DEPT. CONTACT PERSON:

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## MINI-GRANT: COMPUTER ASSISTED INSTRUCTION FOR ADULT BASIC EDUCATION LEARNERS

TARGET AUDIENCE: Rural adults who have not completed high school.

AWARD: TEC-3 August, 1982 - June, 1983 COST: $2,000

This project is designed to improve basic skills education through the use of modern equipment and technology by developing a model for computer assisted instruction in Adult Education Centers located in rural settings.

Adult Education staff identified computer software packages in five subject areas which comprise the GED Test plus computer literacy and life coping skills. Plans for in-service training of staff on computer operation and use of prepared software in instructional programs.

The Adult Education teacher will have access to individualized learning activities including: Drill and Practice; Tutorial - Programs are structured in a question and answer format and use diagnostic and prescriptive techniques. They will assist in remediation and enrichment or acceleration; Simulations - Selected programs will model experiences that are too complex, time-consuming, expensive or dangerous to provide in reality; Game Playing - Programs will give a competitive setting against a non-threatening entity (the computer) for the adult learner to play, score, and win. In addition, adult learners can use the computer to write and execute their own computer programs or adapt existing programs to meet their specific needs.

The project will be evaluated both on an on-going, and on a long-range basis. Teachers will apply records management procedures and achievement data to pin-point student weaknesses, provide activities and individualized assignments directed toward improvement of these weaknesses, and evaluate the effectiveness of these activities in the improvement of deficiencies. Provisions will be made for periodic progress reports and summary reports to appropriate agencies and interested educational institutions. Specific evaluation of the success of the project will be made in terms of the number of inquiries and requests made by potential adopters of Computer Assisted Instruction in Adult Education Programs.

MAJOR PRODUCTS: Periodic progress reports and summary reports will be made to appropriate agencies and interested educational institutions.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Melanie Campbell<br>Project Director<br>Searcy County Adult Education Center<br>Marshall School District<br>P.O. Box 310<br>Marshall, Arkansas 72650<br>(501) 448-5134 | Jim Parker<br>Office of Adult and Vocational Education<br>Division of Adult Education Services<br>ROB 3, Room 5624<br>400 Maryland Avenue, S.W.<br>Washington, D.C. 20202<br>(202) 245-0636 |

## COMPUTER-ASSISTED INSTRUCTION FOR ADULT BASIC EDUCATION (ABE)

TARGET AUDIENCE: Out of school youth and adults of Klamath County

AWARD: 1983 to 1984 Cost: $2,500

Specific objectives are:

- To utilize a computer-assisted approach to learning for Adult Basic Education and English as a Second Language students.
- To utilize computers for ABE data collections and recordkeeping.
- To utilize computers in maintaining vocational skill lists and job descriptions for ABE students.

All students will be tested upon entry. Those who score between third- and seventh-grade levels in reading will be directed to use CAI as one component of their study program for a minimum of five total hours. Students will experience instruction, drill and practice. In addition, they will learn how to gain access to and application of vocational skills and job skill needs lists.

The project will receive financial and/or technical assistance from the Jeld-Wen, Wenco foundation and the Oregon Institute of Technology Computer Science Department. Cooperation and support is community wide, including the North American Job Training Partnership Act Program, Klamath-Lake Employment Training Council, Klamath County School District, Klamath Employment Division of the Oregon Department of Human Resources.

Project staff will assess student progress and level of achievement on a monthly basis. Community agencies will be requested to measure the effectiveness of approach with client referrals.

MAJOR PRODUCT: Project report.

PROJECT DIRECTOR:

Joseph T. Riker
Program Director, KABE
Organization of the Forgotten American
P.O. Box 1257
Klamath Falls, Oregon 97601
(503) 884-5135

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# DEMONSTRATION PROJECT PILOTING HIGH TECHNOLOGY INSTRUCTIONAL SYSTEMS

TARGET AUDIENCE: Adult Basic Education, GED students

AWARD: 7/91/1983 to 3/30/1984 Cost: $29,525

Project objectives are:

1. To provide support for present instructional programs.
2. To provide data for documentation of pupil progress as noted in the evaluation of each student.

This project establishes a computer assisted laboratory with hands-on prescriptive instruction as an integral part of the Rapides Adult Education Center. It will include evaluating and documenting results of a learning laboratory utilizing a high technology system to meet the needs of adult students on an individualized basis.

Pre- and post- scores of criterion referenced tests as well as standardized instruments will provide data for evaluating the laboratory instructional approach. Student and staff checklists will also be included.

MAJOR PRODUCT: Project results will be available after May 1984 in a final project report.

PROJECT DIRECTOR:

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Rapides Parish School Board
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## COMPUTER-ASSISTED INSTRUCTION AND COMPUTER-MANAGED INSTRUCTION IN ADULT BASIC EDUCATION (ABE)

TARGET AUDIENCE: Minority ethnic, rural residents

AWARD: 10/01/1983 to 6/30/1984 Cost: $6,500

The program will provide computer-assisted instruction and computer-managed instruction in ABE programs.

Project objectives are:

1. To acquaint students with microcomputers.
2. Time schedule for students to use computers.
3. Teach computer literacy.
4. Develop an instructional materials inventory.
5. Use a computer management program to test, diagnose, prescribe and record information on student progress.

MAJOR PRODUCTS: Experience with computer courseware for spelling, reading, math, grammar and life skills, and with computer management software

PROJECT DIRECTOR:

Willa Engle
ABE Supervisor
Athens City Schools
Athens, Tennessee 37303
(615) 745-2863

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# CAI: TECHNOLOGY BASED EDUCATION

TARGET AUDIENCE: College students at all levels with particular focus on freshman students with developmental skills needs.

AWARD: G00-83-02189 10/1983 to 9/1984 Cost: $141,134

NYIT Technology Based Education project is developing and implementing computer-assisted instruction using microcomputers for mathematics and English courses to improve students' general and specific academic skills, reduce attrition, and develop a computer literate faculty and student body.

In 1983 the project designed and field-tested a developmental mathematics course implemented on Apple II/Franklin systems using LOGO, whose procedural approach simultaneously allowed the experiential solution of mathematical problems through novel methods of analysis and the unobtrusive acquisition of valuable programming skills. Original algebra game programs served as motivational stimuli while commercially available software, obtained primarily through Conduit, provided more traditional drill and practice.

At the same time an English program using Commodore 64 computers equipped with Data 20 eighty column boards focused on the use of word processing to stimulate flexibility and creativity and facilitate revision in English composition courses aimed not only at the normal freshman population but also at students in need of remedial or advanced training. Faculty participating in the Title III project developed a student manual and disk-based training exercises to accompany Paperclip, the word processor selected for use. Original software to enhance pre-writing organization and develop logical skills in a composition environment will be field-tested in 1984.

To support the considerable student population participating in these courses, NYIT has constructed an integrated microcomputer learning lab designed to permit student access to microcomputers on an individual or class basis within a controlled educational environment. Anyone interested in the goals and development of the project is invited to visit that lab or write for further information.

MAJOR PRODUCT: Mathematics courseware, and student manuals.

PROJECT DIRECTOR:

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New York Institute of
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## EARLY READING AND WRITING IN YOUNG DEAF CHILDREN USING MICROCOMPUTER TECHNOLOGY

TARGET AUDIENCE: Young children, ages 2-6.

AWARD: Grant #G00-83-00361 5/01/1983 to 4/30/1984 Cost: $45,727

The purpose of this proposal is to expand a pilot study which utilized a micro-computer-assisted approach to teaching-reading to more deaf children between 2 and 6 years of age and provide for a systematic appraisal of the effectiveness of the program. The pilot showed a 30 percent increase in mean percentage improvement using the microcomputer. The impact should be improved with further research. The significance lies in the "educational options" that would be opened by early services in reading instruction which it is assumed will become available through the final report, the only deliverable.

MAJOR PRODUCTS: Pilot reading couseware and evaluation report.

PROJECT DIRECTOR:

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Pennsylvania State University
Division of Special Education and
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207 Old Main
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(814) 863-2018

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# A CHILD-COMPUTER-TEACHER INSTRUCTION METHOD FOR TEACHING EARLY READING AND WRITING TO HEARING IMPAIRED CHILDREN

TARGET AUDIENCE: Hearing impaired reading students age 3-10.

AWARD: Grant #G00-83-02959 1/01/1984 to 12/31/1985 Cost: $409,692

This research project will investigate the effectiveness of microcomputer instruction for improving reading achievement in young hearing-impaired children between the ages of 3 to 10. The study uses the microcomputer to develop an interactive system which teaches the child both to read and develops writing and communication skills. The project will expand upon an initial pilot study by using a larger number of classes for hearing impaired-students to: (1) compare the results of traditional approaches to teaching reading to young hearing-impaired students to such instruction supplemented by CAI; (2) assess the impact of the interactive computer approach on the development of communication skills in young hearing-impaired students; and (3) describe how the allocation of instruction time on the computer is related to the development of reading and communication skills.

The microcomputer system used by this project makes use of a special interface keyboard that builds in perceptual salience, individualized vocabulary, animation, and color graphics. It allows the child instant access to many printed words and accompanying graphics. Because it is interactive the child not only learns to read, but can also experiment with sentence structure and syntax at an earlier age than with traditional approaches for young hearing-impaired children.

MAJOR PRODUCTS: Pilot microcomputer system and research reports.

PROJECT DIRECTOR:

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90

## PRIMARY GRADES READING COMPREHENSION PROJECT

| | |
|---|---|
| TARGET AUDIENCE: | Students in grades 1-3; teachers of reading comprehension at the early primary level. |

AWARD: Grant #G00-83-03597 1/01/1984 to 1/31/1986 Cost: $150,000

The Primary Grades Reading Comprehension Project will include a video and computer program for teaching reading comprehension at the early elementary level (grades 1-3), and a video-based, interactive in-service training program for reading teachers. Both sets of programs (student and teacher) will be based on the work of reading experts at the University of Illinois Center for the Study of Reading, the University of Wisconsin, and the Wisconsin Department of Public Instruction. Student and teacher programs will be tested extensively in Wisconsin and made available for national distribution and use through the Agency for Instructional Television.

The student component of the reading comprehension project will include a series of twelve video programs. These programs will illustrate central concepts basic to comprehension using situations and experiences which also serve as foundations for passages the viewers will read. A complementary set of twelve computer programs will permit students to review these concepts and to apply them to new situations through strategic simulation. Computer programs will be written for microcomputers most commonly available in Wisconsin schools such as Apple IIe.

The teacher-training component, on which the student materials are based, will present educational theory and demonstrate the practice of teaching reading comprehension in a series of fourteen, half-hour instructional video programs designed to be used in an interactive telecommunications setting.

MAJOR PRODUCT:

- o Set of twelve student video programs
- o Set of twelve related computer programs for students
- o Teacher guide for student programs, including passages prepared for students to read
- o Set of fourteen teacher training video programs
- o Teacher in-service manual (includes print material for use during interactive in-service sessions, print materials for use by university faculty who provide in-service instruction, and information for telecommunications systems technical staff

PROJECT DIRECTOR:

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# MICROCOMPUTER ASSISTANCE TO INSTRUCTION IN READING AND VERBAL SKILLS

TARGET AUDIENCE: Average and low-achieving students in grades 2-6.

AWARD: Institutional Grant NIE-G-83-0004 12-01/1982-11/30/1984
Cost: $216,070

A major objective of research on reading and comprehension at the Learning Research and Development Center is to understand how early reading skills are acquired and how these are related to the successful development of comprehension. Emphasis is on children who have difficulty in developing reading skills. The results of research funded by the National Institute of Education have made possible the design of computer based vocabulary and comprehension instruction. A project to develop and test instructional computer programs, funded by a private foundation, is currently under way. Two game programs are now being tested: "Build-a-Word" and "Hint and Hunt." Both are designed to give extensive practice in identifying important sub-word units that make up most of the words children use. Build-a-Word focuses on consonants and phonograms; Hint-and-Hunt emphasizes the role vowels play in distinguishing words. The games are programmed to the Apple computer with audio capability and joystick manipulator.

MAJOR PRODUCTS: Two experimental computer games for instruction and practice in word decoding and recognition.

PROJECT DIRECTOR:

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## CHILDREN'S ORAL COMMUNICATION SKILLS

TARGET AUDIENCE: Elementary school students and their teachers

AWARD: Grant NIE-G-81-0009 12-01-80 to present Cost: $54,000 for FY 83

This research project will develop and evaluate techniques for teaching, speaking and listening skills to elementary students.

Microcomputers will be used to teach and assess a variety of speaking and listening skills. Games have and are bing developed for the Apple microcomputer for pairs of children to give each other directions on drawing a face or a map of a model town. Other studies will take advantage of the ability of the microcomputer to speak and to provide children with models of effective communication. One study will have the microcomputer "think out loud" to help students learn tc compare and describe differences. Another study will given children feedback on whether they failed to ask for more information when they needed it.

The studies will be carried out in one of the Center's Focal Schools. Analysis of the effects of training will take into account effects due to race and sex of the individual children, as well as the effects of different patterns of pairing these children in the communication activity.

MAJOR PRODUCTS:

- 2 Microcomputer Communication games and manuals
- 4 Microcomputer programs that can serve as a prototype of a training package
- Research reports
- Documentation of "Instrumentation--Equipment Materials and Procedures for Communication Research"

PROJECT DIRECTOR:

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## MERRIMACK EDUCATION CENTER CAI PROJECT

TARGET AUDIENCE: Compensatory education students, grades 2-9. Training available for teachers of this population.

AWARD: G008201708 9/1/82 to 8/31/86 COST: $76,852 (two years)

As part of a comprehensive system, the Merrimack Education Center CAI Project combines commercially available courseware with supportive organizational arrangements including personnel training, materials, manuals, hardware and software maintenance, learning environment management, and technical assistance to provide individualized, structured, and sequenced reading drill and practice and tutorial services for students in Chapter I classrooms.

Materials for instruction have been organized in a series of age/grade curriculum strands that are available in both computer-assisted instruction and paper-and-pencil form. Two-thirds of classtime is spent in small group or tutorial sessions with the teacher. The remaining third is spent interacting with the CAI system. Information is presented to each student in small chunks. Depending on what type of response a student makes, the computer takes an appropriate step -- for a correct response, reinforcement and new material; for an incorrect response, a chance to try again. The teacher can assign the student a special drill for remediation when necessary. The computer management system keeps track of each student's progress and generates reports for use by teachers and administrators.

Approved by the Joint Dissemination Review Panel, Merrimack Education Center's (MEC) CAI Project has received dissemination funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what the project offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. Host computer services 96 terminals. Cost of a cluster of eight terminals, which services 240-300 students during the normal school week, is $30,950 for years one and two. Cost includes training, technical assistance, full maintenance, lease-purchasing of equipment, insurance, evaluation assistance, all courseware, and stand-by terminal tests.

PROJECT DIRECTOR:

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For related Chapter I support:
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# HOSTS Reading: Help One Student to Succeed

TARGET AUDIENCE: Pupils in grades 2-12.

AWARD: Ongoing as of 1983 and funded through the State via ECIA Chapter I

HOSTS reading is a mastery learning program that utilizes citizen and business participation (30,000 volunteers nationally) plus computer technology to improve reading achievement. HOSTS features a computerized data base involving the cross-referencing of learning materials for teaching. Materials have been indexed to learning objectives in the mastery of reading skills. The data base references 750 titles by publishers. It has been compiled over a period of 11 years by teachers implementing HOSTS.

The program has been approved by the JDRP for students who need remedial reading instruction, grades 2-12. It has been used in other settings with kindergarten and first-grade students, but no evidence of effectiveness has been submitted to or approved by the Panel.

MAJOR PRODUCTS: Awareness materials
Computerized Data Base

PROJECT DIRECTOR:

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Executive Director
HOSTS Non-Profit Corporation
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Vancouver, Washington 98661
(206) 694-1705 or 693-1775

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# USING CAI TECHNOLOGY IN THE LEARNING OF ENGLISH LANGUAGE SKILLS BY LAKOTA SIOUX CHILDREN-RAPID CITY AREA SCHOOLS

TARGET AUDIENCE: Limited English Proficient (LEP) students in grades 3-6 who are Lakota Sioux Indians with varying proficiencies in English.

AWARD: G000-82-00785 7/01/1982 to 6/30/1984 Cost: $600,000 for a 3-year period

This project will use CAI to reinforce lessons previously learned in the classroom, and trained aides will monitor progress of students.

CAI programs used will include language arts and cultural studies. As Lakota Sioux children have relied traditionally on oral language experience to internalize learning, the project believes that microcomputers would better expose children to written material. The amount of native language used will vary as the degree of limited English proficiency of the student varies.

MAJOR PRODUCTS:
- Language Arts and Reading Materials
- Lakota Cultural Materials
- CAI materials for a microcomputer

PROJECT DIRECTOR:

James Livermont
Title VII Director
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Rapid City, South Dakota 57701
(605) 394-4028

ED. DEPT. CONTACT PERSON

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## WRITTEN COMMUNICATIONS: UTILIZATION OF TECHNOLOGY IN THE DEVELOPMENT OF BASIC SKILLS INSTRUCTION (PROJECT QUILL)

TARGET AUDIENCE: Average learner in grades 3 to 6 with appropriate applications for handicapped, gifted, and culturally diverse children.

AWARD: Contract 300-81-0314 10/1/81 to 9/30/84 Cost: $774,935

The purpose of this project is to develop, test, and disseminate an integrated program involving the use of microcomputers in writing instruction. More specifically, the project seeks to create writing tools and a writing environment compatible with research on writing as a process, e.g. precomposing, composing, revising. Specific components of the writing program include the "Planner" and the "Writer's Assistant" (text editor), which teachers and students use to facilitate effective writing, and the "Library," "Storymaker," and "Mailbag," which motivate students to write. Programming utilizes an Apple II microcomputer with two disk drives, 64K memory, additional equipment to provide for upper and lower case and an 80 character per line display, a monochromatic monitor, and a printer.

QUILL is being implemented in three phases: the focus of year 1 was the development of microcomputer software; of year 2, the field test of this software tools and the development and conduct of teacher training; and of year 3, dissemination and implementation in limited additional sites to identify critical elements for successful widespread use.

MAJOR PRODUCTS: Set of microcomputer software
Teacher's Guide
Implementation Guide

| PROJECT DIRECTORS: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Bertram Bruce and<br>Andee Rubin<br>Bolt Beranek and Newman, Inc.<br>50 Moulton Street<br>Cambridge, Massachusetts 02238<br>(617) 497-3330 | Sheldon Fisher<br>Office of Educational Research and Improvement<br>Division of Technology, Resource Assessment and Development<br>Brown Building, Room 711<br>400 Maryland Avenue, S.W.<br>Washington, D.C. 20202<br>(202) 254-5856 |

## READING: UTILIZATION OF TECHNOLOGY IN THE DEVELOPMENT OF BASIC SKILLS INSTRUCTION (PROJECT IRIS)

TARGET AUDIENCE: Average learner in grades 4 to 6 with appropriate applications for handicapped, gifted, and culturally diverse children.

AWARD: Contract 300-8-0844 10/01/1980 to 10/31/1983
Cost: $749,959

The purpose of IRIS (Individual Reading Instructional System) is to develop, test, and disseminate a new curriculum and methodology involving the use of microcomputers to improve the teaching of reading comprehension. The overall program is based on the theory that comprehension is an interactive process in which textual material, containing of necessity only partial information, activates concepts the reader already has learned which enable the reader to organize and expand upon the new material.

This reading comprehension program, delivered on Apple computers, consists of a management system; a user identification system; and a series of exercises designed to provide drill, practice, and help across five skill areas of reading comprehension. The program is delivered in the form of mock newspapers, organized by grade level, readability, and interaction type. Access to specific newspapers is controlled by a student's current level of achievement. Students may select from a range of newspapers and from among five stories in each newspaper. The stories require the student to interact in one of the following five ways: (1) Inference from text, (2) deletion (eliminating irrelevant, redundant, or insignificant sentences), (3) interpretation of graphically presented information, (4) argumentation (analysis and evaluation based on criteria), and (5) vocabulary (root words). Teacher training is an integral and necessary part of the program.

MAJOR PRODUCTS: User Package (45 discs, User's Manual, Placement Tests); Demonstration Package (5 discs, paper on how to use program); Teacher Training Package (8 sample discs, Instructional Manual, discussion paper)

PROJECT DIRECTOR:

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WICAT, Inc.
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## APPLIED COMPUTER TECHNOLOGY IN EDUCATION--(Compton U.S.D.)

TARGET AUDIENCE: Limited English Proficient students whose first language is Samoan, grades 4-6.

AWARD: Grant G00-83-02104 8/01/1983 to 7/31/1986 Cost: $480,000

The purpose of the project is to provide E.S.L. instruction to LEP students who are native Samoan speakers. Students receive classroom instruction in their native language. Reinforcement activities in E.S.L. are provided through computer assisted instruction.

The computers are also used for computer managed instruction to generate diagnostics and to evaluate students.

Achievement of project students will be compared to students with similar backgrounds who are receiving instruction in a similar curriculum, but without the benefit of CAI.

Staff development for teachers includes coursework/workshops in CAI, CMI, and computer literacy.

The project plans to use Apple IIE microcomputers.

MAJOR PRODUCTS: Develop CAI modules for reading and language arts; guide books for republication purposes; evaluation report.

PROJECT DIRECTOR:

Frank Goodman
Compton U.S.D.
604 South Tamarind Avenue
Compton, California 90220
(213) 639-4321

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# COMPUTERS ON THE MOVE/COMPUTADORES EN MARCHA

TARGET AUDIENCE: Limited English Proficient (LEP) students in grades 4-12 whose dominant language is Spanish, and their parents.

AWARD: G00-83-01501 7/01/1983 to 6/30/1986 Cost: $500,000
over a 3-year period

This project proposes to increase parental involvement in the educational process by providing a systematic program of instruction in English as a Second Language (ESL) and Computer literacy for them. Parents will then teach their children the computer skills learned and will eventually volunteer as aides in Title VII classrooms.

Training will take place in two mobile units equipped as classrooms. The project will begin with grades 4-6 for the first year, with grades 7-8 and grades 9-12 added the last two years, respectively.

MAJOR PRODUCTS:
- Information brochure
- Parent involvement manual
- Implementation guide
- Multimedia slide presentation
- Software for ESL reinforcement

PROJECT DIRECTOR:

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Gilroy Unified School District
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Gilroy, California 95020
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# BILINGUAL EDUCATION COMPUTER ASSISTED SOFTWARE (BECAS) PROJECT

TARGET AUDIENCE: Limited English Proficient (LEP) students in grades 7-9 whose native language is Spanish.

AWARD: G00-83-02063 8/01/1983 to 7/31/1986 Cost: $500,000 over a 3-year period

This project proposes to develop CAI software designed to increase the English proficiency of LEP students at the junior high school level. The curriculum will complement the ESL program of Dade County School System.

After the BECAS curriculum has been developed it will be field tested in 3 target junior high schools, and BECAS teacher training sessions will be held.

MAJOR PRODUCTS: CAI-ESL software consisting of 20 units of CAI for each ESL level.

PROJECT DIRECTOR:

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## PROJECT BITE
Portland, Oregon

TARGET AUDIENCE: Native speakers of Lao, Mien, or Vietnamese in grades 9-12.

AWARD: Grant G00-83-02871 9/01/1983 to 8/30/1986 Cost: $570,000

The purpose of the project is to provide evidence that intensive CAI in bilingual English vs ESL setting will significantly improve the writing skills of Limited English Proficient (LEP) students ans will assist them in advancing into mainstreamed classes. The instruction will focus on three main areas: vocabulary, grammar and composition.

CAI modes include drill and practice, word processing, gaming and composition. CAI will be provided to reduce the psychological barriers to learning in language gaming and group lessons and to help students learn the structure of the language in drill and practice sessious. The project is basing its dual approach on Krashen's theory of language development.

Staff will be trained in CAI and computer literacy.

Primary activities for the first year are developmental. In years 2 and 3 the project will provide services and collect data.

Hardware to be used in the project is Apple IIE microcomputer.

MAJOR PRODUCTS: List of software program; summary of evaluation results; compile and disseminate staff training materials.

PROJECT DIRECTOR:

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# SIERRA READING LAB PROGRAM

TARGET AUDIENCE: Teachers of students grades 7 and 8.

AWARD: Grant G008301130 11/1/83 to 10/31/87 COST: $35,960 (first year)

The Sierra Reading Lab is a program of developmental/corrective reading instruction in a laboratory setting which utilizes computers as one of ten learning centers. The other centers focus on reading comprehension, structural analysis, vocabulary, self-esteem, listening, research, library skills and recreational reading. A diagnostic/prescriptive approach to teaching assures each student of individualized instruction. The focus and skills to be mastered are determined for each student at the beginning of the seventh grade using the PRI as a measurement tool of reading abilities. Students with familiar deficiencies are grouped together; students move to other skill areas as specific skills are mastered. The computer center provides reinforcement, extension, and enrichment experiences.

The Sierra program includes a week-long staff development component. Topics include use of computers in the classroom, use of instructional materials, individualized instructional techniques, and student motivation strategies.

Approved by the Joint Dissemination Review Panel, Sierra Reading Lab has received dissemination funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what Sierra Reading Lab offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available.

PROJECT DIRECTOR:

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## APPLYING TECHNOLOGY TO SECONDARY SCHOOL WRITING

TARGET AUDIENCE: All students in grades 7 through 12; junior and senior high school English and content area teachers.

AWARD: Grant #00-83-03406 10/01/1983 to 9/30/1984 Cost: $122,685

The purpose of this project is to develop, field test, and evaluate a microcomputer-based program designed to improve secondary student writing ability. The project will use commercially available software developed under contract with the U.S. Department of Education, known as QUILL, as the basis for a comprehensive training and implementation program.

The project integrates motivating, "real world" software tools with a teacher training program that emphasizes effective strategies for teaching writing. Implementation of the program is supported by in-class coaching and ongoing assistance coordinated by a local facilitator. Students will learn to use "real world" software tools, including a text editor called Writer's Assistant, a prewriting "PLANNER", a "LIBRARY" for composing, storing, reading, and revising students' writing, and a "MAILBAG" for sending messages and exchanging information, while developing writing and revising skills. Teachers will expand their repertoire of instructional strategies, while developing skills in managing classroom computer use.

QUILL software operates on an Apple IIe microcomputer (or II+ 64K memory), with two disk drives, an 80 column display card, a monochromatic monitor, and a printer.

During Phase I, Development, project staff will work with consultants and teachers to develop: instructional activities in composing, proofreading, revising, and content-area writing; management procedures to support the use of QUILL; and the teacher training and implementation support components. During Phase II, Field Test and Evaluation, staff will assess the activities and training design, collect and evaluate student writing samples and observe in-class activities. During Phase III, Dissemination staff will distribute printed materials, make presentations, publish articles, coordinate on-site visits, and conduct demonstrations.

MAJOR PRODUCT: Teacher's guide for secondary writing using QUILL, with student modules for learning the software and practicing writing skills; a Practice Profile, describing the replicable components of the program.

PROJECT DIRECTORS:

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Susan F. Loucks
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## READING EDUCATION ACCOUNTABILITY DESIGN: SECONDARY (PROJECT READ:S)

TARGET AUDIENCE: Students grades 8 and 10. Training available for all secondary teachers.

AWARD: G008301129 11/1/83 to 10/31/87 COST: $43,961 (first year)

Project READ:S is a comprehensive, microcomputer-assisted, reading-in-the-content-areas curriculum. It emphasizes student mastery of sixty, priority, adult-level reading skills through the use of cooperative teacher-developed instructional modules in vocabulary, comprehension, and study skills. The program integrates five basic components: computers for management and instruction; management, for record keeping; instructional, which emphasizes direct skills instruction by Language Arts/English teachers; reinforcement, which provides for mastery of the priority reading skills in all content areas; and in-service, which focuses on both the content and processes of instructional delivery. The computer-assisted component of READ:S contains five major systems: program development, program management, teacher in-service, student instruction, and product development and documentation.

Approved by the Joint Dissemination Review Panel, READ:S has received dissemination funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what READ:S offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. The training packet costs $55 and the optional management system diskettes are $500 per set.

PROJECT DIRECTOR:

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# LANGUAGE INSTRUCTION FOR RECENT IMMIGRANTS THROUGH COMPUTER TECHNOLOGY

TARGET AUDIENCE: Limited English Proficient (LEP), students in grades 9-12 whose dominant language is Spanish, Lao, Hmog or Vietnamese.

AWARD: G00-81-03181 9/01/1981 to 8/31/1984 Cost: $191,928

This project proposes to serve LEP high school students using an "individualized, readily accessible" CAI program. The exemplary approach will be to use technology to provide bilingual instruction to students who would normally be placed in English as second language (ESL) classes because the district does not have adequate staff to teach in the LEP students' dominant languages. Curriculum translation is planned. Content includes ESL, survival skills and cultural units. Other courses in which students are enrolled will be translated into the student's native language.

MAJOR PRODUCTS: ESL courseware with Spanish, Lao, Hmong and Vietnamese translations.

PROJECT DIRECTOR:

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Denver Public Schools
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Denver, Colorado 80204
(303) 935-2674

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# COMPUTER BASED BILINGUAL EDUCATION DEMONSTRATION PROJECT
## MONROE COUNTY, FLORIDA

TARGET AUDIENCE: Spanish-speaking Limited English Proficient students in grades 9-12.

AWARD: Grant G00-83-01498 7/01/1983 to 6/30/1986 Cost: $480,000

The purpose of the project is to demonstrate that the computer-based ESL approach will significantly increase English language skills of LEP students in grades 9-12. The ESL skill areas provided through CAI are: listening and reading comprehension, grammar, writing and conversational skills. The justification for using this approach with the target group is the system's ability to provide individualized, self-paced instruction.

The students' native language will be integrated into the CAI lessons. Tutorial messages are provided in either English or Spanish, depending upon the student's level of English proficiency. Inservice training will be provided to staff by the software/hardware vendor Computer Curriculum Corporation (CCC).

Products used are Computer Curriculum Corporation ESL software.

The project uses CCC minicomputers and digital speech system.

MAJOR PRODUCTS: Dissemination Packets and Report of Evaluation findings.

PROJECT DIRECTOR:

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Key West, Florida 33040
(512) 256-3383

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# EFFECT OF MICROCOMPUTER-ADMINISTERED SPELLING ASSESSMENT ON HANDICAPPED STUDENT PERFORMANCE AND TEACHER MANAGEMENT

TARGET AUDIENCE: Handicapped students.

AWARD: Grant #G00-83-02860 7/01/1983 to 6/30/1984 Cost: $50,000

The purpose of this study is to investigate the effectiveness of microcomputer versions of dictated spelling tests on the performance of mildly handicapped students. The project will systematically study the presumed, but empirically unsupported, educational benefits expected from use of microcomputers to assess spelling achievement in special education settings. The study will question the appropriateness of simplistic "replacement" theories of technological innovation which presume that microcomputers can "replace" teachers in performing formative evaluation of the handicapped student's progress. While the study is targeted at a specific educational application of microcomputer technology, it is designed to generate empirical data which will clarify broader professional and policy issues in special education.

MAJOR PRODUCT: Research report.

PROJECT DIRECTOR:

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## INDIVIDUALIZED COMPUTER ASSISTED REMEDIAL READING PROGRAM (I CARE)

TARGET AUDIENCE: Educationally deprived vocational education students in grades 10-12. Training available for teachers of this population.

AWARD: Grant G008301136 11/1/83 to 10/31/87 COST: $39,925 (first year)

Through the use of a microcomputer, individualized and small group instruction allows students to set their own learning pace in this program to supplement the existing reading program for the high school vocational education student. In lieu of a regular English class, students in the I CARE Program concentrate, on a weekly rotating basis, on one of the following five areas: vocabulary (over 100 computer programs), reading (190 computer programs), reading and writing skills, audio tapes, and paperback books. The ability of the microcomputer to repeatedly review materials without making value judgements, tiring, or losing enthusiasm enables the curriculum to be highly effective. The teacher determines the content of the computer program and the computer drills, tests, and scores the student.

Approved by the Joint Dissemination Review Panel, I CARE has received dissemination funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what I CARE offers and to provide inservice training, follow-up assistance, and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. Three computer master tape programs have been developed to enable teachers to author their own programs in vocabulary and spelling, speed reading, and comprehension at a cost of $50 per program or $125 for all three.

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## VIDEO ASSISTED COMPUTER INSTRUCTION FOR DEAF HIGH SCHOOL STUDENTS

TARGET AUDIENCE: Deaf high school students.

AWARD: Grant #G00083-00314 7/01/1983 to 6/30/1984 Cost: $50,000

The purpose of this proposal is to study the use of Video Computer Assisted Instruction (Video CAI) in improving deaf high school students' reading ability. A program for combining video technology and CAI will be produced and disseminated.

MAJOR PRODUCTS: Pilot video computer assisted instruction in reading.

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## DEVELOPING A MICROCOMPUTER-BASED READING SKILLS PROGRAM

TARGET AUDIENCE: Psychiatric patients.

AWARD: TEC-17 July 1, 1982 - January 30, 1983 COST: 35,000

Eight minicomputers were made available from the resources of the San Antonio State Hospital. These were put in a special computer assisted instruction laboratory, located adjacent to the adult basic education classroom where instruction is provided to those mentally handicapped clients who require assistance in attaining proficiency in basic literacy skills subject areas. The project staff developed software programs for teaching basic reading skills to the adult non-reader, featuring the innovative use of interactive graphics and sound (voice) tutorials to develop those fundamental skills which the non-reader will need to master if he or she is to be able to read.

Three groups of adult non-readers will be selected to participate in the special project.

Group A will undergo basic reading skills instruction presented via specially developed computer assisted instruction software featuring interactive graphics and sound (voices tutorials). Group B will undergo basic skills instruction presented via the traditional non-interactive computer assisted instruction approach. Group C will function as the control group and be presented basic reading skills instruction via traditional classroom teaching methods.

Care will be taken to equate the three groups in terms of age, IQ, sex, diagnosis, and present level of mastery of basic literacy skills and any other variable that may be construed to be correlated with the dependent variable to be studied. Equivalent subject matter will be prepared for use under each of the three learning conditions specified earlier. A pre- and post-test adequately sampling the universe of knowledge dealt with in the pilot project will be developed and administered to all participating individuals, to reveal their extent of mastery of basic reading skills. Time required to attain mastery under the various learning methods and conditions will also be analyzed.

MAJOR PRODUCTS: A complete microcomputer-based "system" designed to teach adult non-readers how to read will be developed. This will include software for use with microcomputers, using BASIC computer-language, with emphasis on reading so that the non-reading, mentally impaired adult can learn to read at least to the fifth grade level. The "system" will have three principal end products: microcomputer software, audio-tutorial cassettes, and graphics support material consisting of approximately 1200 illustrated cards bound in two easel volumes. Copies of the computer assisted instruction materials (manual, software discs, and audio-tutorial cassettes) will be made available from the San Antonio State Hospital, Box 23310, San Antonio, Texas 78223, on a cost of reproduction basis.

PROJECT DIRECTOR:

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# TRAINING ADULTS TO READ ON MICROCOMPUTERS

TARGET AUDIENCE: Non-reading adults.

AWARD: TEC-4 July 1, 1982 - June 30, 1983 COST: 1,968

This project will use microcomputers in training adult learners in the basic skill of reading. The underlying theory would suggest that adult learners would learn best in a completely individualized setting as opposed to a classroom setting since the adult learner would be already focused on learning basic skills rather than learning the rules of classroom management.

This project is designed to increase the rate of learning of students enrolled in an adult reading class; to work cooperatively with the administrators of the Adult Learning Centers in Little Rock areas in selecting several students to participate in a computerized learning program; to determine the feasibility of using computers as a method of teaching adult students based on their preference and learning style; and to compare the time and cost factor using computers versus traditional methods of teaching.

Five volunteers will be selected by the administrators of adult education centers in Little Rock. The students will be allowed to come to the campus for training from 8:00 a.m. to 5:00 p.m. on Friday. The students will be required to log in 8 total hours of instruction each week. All periods of training will be supervised by a full time employee of the College of Education. Prior to training, the students will be assessed in reading skills. Pre assessment and post assessment instruments will either be the same or equal to the instruments used in adult learning centers presently in operation. The students will be assessed during training using the computer, and a progress record will be maintained on each student.

Pre and post evaluation will be conducted on the five students in the form of paper and pencil tests, tests on the computer, interviews, and questionnaires.

MAJOR PRODUCTS: An evaluation of the effects of the program on five students.

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# DEVELOPMENT OF MICROCOMPUTER SOFTWARE PROGRAMS FOR TEACHING ENGLISH AS A SECOND LANGUAGE (ESL)

| | |
|---|---|
| TARGET AUDIENCE: | Adult English-as-a-second language (ESL) students. |
| AWARD: | 7/01/1983 to 6/30/1984 Cost: $30,000 |

The purpose of the project is to research, identify or formulate, develop and refine through an initial implementation stage a microcomputer software program that will assist English as a Second Language adult learners to acquire essential skills. The project will include a model implementation plan for adult education programs, a staff development manual to engage teachers and a student packet to allow teachers and students to interact confidently with computer-assisted learning.

The project will address the widely felt priority of individualizing learning in ESL and expanding the effective range of the teacher over several levels. The program will be measured by the total student contact hours generated, the average student contact with computer-assisted learning (CAL) per session and the average student with CAL during the enrollment period. Level gains and student evaluations will measure acceptance. Staff evaluation forms will measure instructor acceptance of the CAL products.

The project will:

1. Develop software for use with microcomputers with emphasis on ESL.
2. Programs will be essentially self-instructional and will include sound.
3. Programs will contain flexibility of branching or other means to accommodate ESL students of various skill levels.
4. Content must be adult oriented using life-coping skills information whenever possible.
5. Evaluate the quality of the software for effectiveness in helping ESL adults learn.
6. Develop a handbook on how to use the software in ESL classes.

MAJOR PRODUCT: Microcomputer software programs for adult ESL students.

| PROJECT DIRECTOR: | ED: DEPT: CONTACT PERSON: |
|---|---|
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113

# INTEGRATING COMPUTER TECHNOLOGY TO SERVE THE NEEDS OF STUDENTS AND TEACHERS IN WRITING COURSES

TARGET AUDIENCE: Students and teachers in college Writing courses.

AWARD: Grant G0082-01467 7/1/82 - 6/30/85 Cost: $230,000 est.

This proposal has three main objectives: 1) to study the writing of advanced undergraduates who will be able to use word processors (or computers which can function as word processors) as they draft and edit their papers for composition courses; 2) to determine how writing for special purposes (e.g., business, the liberal arts, engineering) can best be improved by this technology; and 3) to insure that word processors are used as well and as imaginatively as possible to help students write and teachers teach.

This proposal is for a three-year project including a needs assessment, system development, and implementation and evaluation. First year efforts would study existing computer programs and system software in the light of the demands of student writers and their teachers, and the formal features of various types of writing, to determine the needs of student writers which new software would address. Second year, the staff will develop and document new computer programs which earned highest priority in the needs assessment, and insure that both students and teachers will understand how the programs can complement their individual writing and teaching styles. In the third year, staff would be able to test the programs on a significant number of students in upper division composition classes each academic term.

In addition, both the programming effort and the implementation phase would address the issue of how what is developed and used can be implemented on a variety of kinds of word processors, both at the University of Minnesota and in writing programs at other institutions.

MAJOR PRODUCTS: Multi disciplinary Word Processing program.

PROJECT DIRECTOR(S):

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# A COMPUTER-BASED FOREIGN LANGUAGE WRITING PROGRAM

TARGET AUDIENCE: College French language students.

AWARD: Grant GC083-02811 1/1984-12/1986 Cost: $42,130
(only Year 1 FIPSE support)

This is an interactive computer program for the improvement of writing skills in French language courses. The computer program will function in conjunction with standard classroom instruction and assume the burden of monitoring writing assessments during the actual process of writing. It provides for students to compose directly at the computer terminal and receive immediate commentary, correction, or interactive interrogation on their individually created sentences. Spelling, declension, agreement, verb forms, and elementary syntax and usage will all be monitored by the program as the student enters his or her sentences at the keyboard. In the event of errors or the inability of the computer to understand, a dialog will be initiated allowing the student to "teach" the computer new terms or learn about the grammatical principles underlying particular mistakes in the text. At the completion of the assignment, the student will be able to obtain a clean copy of his or her written work for further study or to hand in to the instructor for comments on usage and style.

While no equivalent of such a project is currently underway in the United States, much work on English language analysis has already been done, generating some powerful programs which we intend to adapt to our own particular needs. This will allow us to "piece together" an extensive set of programs in a minimum of time, and at a minimal cost, while assuring that we do not reinvent the wheel. Because we are working on the UNIX system developed by Bell Laboratories, our results will be immediately transportable to hundreds of sites throughout America.

MAJOR PRODUCTS: A computer program to correct the writing of French

PROJECT DIRECTOR:

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# THE USE OF MICROCOMPUTERS FOR MATHEMATICS INSTRUCTION IN GRADES 1-4

TARGET AUDIENCE: Mathematics students in grades 1-4.

AWARD: Contract SED 80-12268 7/01/1980-12/31/1982 Cost $25,048

This project will develop 10 to 15 computer games to be used as supplements to mathematics instruction in grades 1 through 4. The computer will be used as a learning center in the classroom. The games to be developed are based on typical game strategies used with older students: practice in skills; applications of mathematics; and problem solving. Games will be designed for use by both small and large groups. The mathematical content of the programs will cover the 10 basic skills areas identified by the National Council of Supervisors of Mathematics. Development will stress the following: (a) appropriateness of mathematical content; (b) ease of program use, and (c) use of color graphics and animation of increased motivation, user-involvement, and effectiveness of communications. Elementary teachers will be involved in the development of the programs, and the programs will be field-tested in public schools.

MAJOR PRODUCTS: 10-15 computer games for mathematics instruction

PROJECT DIRECTOR:

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# EARLY LEARNING (GRADES 2-3) OF GEOMETRY AND LOGIC, USING MICROCOMPUTERS

TARGET AUDIENCE: Children age 7-8 including users of standard English, Black English and Spanish.

AWARD: Contract SED 80-12510 9/10/1980-2/28/1982 Cost $130,000

Young children can learn mathematics in a playful, interactive manner using today's microcomputers. Games, inquiry learning sequences, and puzzles can be programmed on a low-cost, powerful computer with color graphics, natural sounding speech, music, and a variety of input devices. Children can use a joystick, a graphics tablet, a light pen, and a special children's keyboard to explore mathematics concepts. The project will develop microcomputer software which will enable children aged 7 and 8 to discover geometry concepts and to develop logical thinking. The microcomputer programs will be paced and sequenced to provide a dynamic learning environment for young children. Some computer programs will be prepared in three versions: with standard English, Black standard English, and Spanish voice prompts. Teacher's manuals for each program will be written in Spanish and English. The programs will be designed for gifted children as prototypes of a mathematics enrichment curriculum on microcomputers. Commercial publication will be sought.

MAJOR PRODUCTS: Computer software using Geometry concepts

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Ann Piestrup<br>Advanced Learning Technology<br>13800 Skyline Boulevard<br>Woodside, California 94062<br>(415) 851-0633 | Patricia A. Butler<br>National Institute of Education<br>Program on Teaching and Learning<br>1200 19th Street, N.W.<br>Washington, D.C. 20208<br>(202) 254-5706 |

## TITLE I MATHEMATICS COMPUTER ASSISTED INSTRUCTION (CAI)

TARGET AUDIENCE: Mathematics teachers of students grades 3-6.

AWARD: G008301140 11/1/83-10/31/87 COST: $43,059 (first year)

A diagnostic/prescriptive pull-out mathematics program, Title I Computer Assisted Instruction (CAI) is operated with close coordination of math-lab instruction and daily CAI drill. The CAI program adjusts instructions to the level of the student and provides immediate feedback. The CAI program provides daily, weekly, and monthly descriptions of progress and areas of difficulty which the classroom teacher can use to correct specific conceptual misunderstandings. Classroom instruction is imperative in providing conceptual understanding and remediation. Daily CAI drill provides the practice which Title I students especially need. This program has operated with 40 minutes a day mathematics laboratory time and 10 minutes of CAI. The particular program used was devised by Computer Curriculum Corporation of Palo Alto, California.

The addition of CAI instruction produces significantly superior achievement when compared to standard mathematics laboratory instruction.

Approved by the Joint Dissemination Review Panel, CAI has received dissemination funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what CAI offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. Installation cost are approximately $200 per student if at least 200 students are enrolled. Cost is dramatically reduced after initial year.

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# COMPUTER-ENHANCED STATISTICS MODULES FOR THE UPPER ELEMENTARY GRADES

TARGET AUDIENCE: Upper elementary mathematics students.

AWARD: Contract SED 80-24223 6/01/1981-5/31/1983 Cost $110,442

This project will develop prototype computer-enhanced elementary mathematics curriculum units. It will use computers for simulation, games, information storage and retrieval, and open and guided discovery to introduce upper elementary school students to statistics. A major focus will be the development of students' heuristic problem-solving skills through their command of the computer's capability to simulate experiments, alter values of variables, make tables, draw graphs, present a simpler problem, or present a related problem. The units will include goals, objectives, computer and/or non-computer learning experiences, teacher guides, and evaluation instruments.

Formative and summative evaluations will be conducted to assess the materials, their usefulness, and student outcomes. The project will also produce a teacher education module for future teachers of the statistics materials.

MAJOR PRODUCTS: Prototype mathematics curriculum units

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## INDIVIDUALIZED PRESCRIPTIVE ARITHMETIC SKILLS SYSTEM (IPASS)

TARGET AUDIENCE: Mathematics teachers and aides in grades 5 and 6.

AWARD: Grant G008202434 10/1/82 to 9/30/86 COST: $59,049 (two years)

IPASS is a well-defined logically structured sequence of activities for remedial mathematics which supplements regular classroom instruction. The program features the use of microcomputers for management of student progress and for instruction. Software developed for student management facilitates easy identification of student performance levels, appropriate selection of instructional materials, timely feedback to students, and regular assessment of student progress.

Project-developed software for instruction covers 159 specific performance objectives in basic arithmetic skills through activities organized into five instructional units at each grade level. Learning takes place through drill and practice. Commercially available software is used as a supplement. Workbooks and worksheet materials have been identified and cross-referenced to each unit in order to provide extra practice. Student progress is tested at the end of each unit with project-developed, criterion-referenced tests. Instructional computer games have also been developed to motivate students.

Approved by the Joint Dissemination Review Panel, IPASS has received dissemination funds from the National Diffusion Network to make public and nonpublic schools, colleges, and other instutitions aware of what IPASS offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. Software is available for the TRS-80, Apple, and Commodore Pet microcomputers, and includes computer programs, criterion-referenced tests, student profile sheets, instructional resource file, and procedure guide for teachers and students at a total cost of $250.

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## TECHNOLOGY AND BASIC SKILLS (TABS): MATHEMATICS

TARGET AUDIENCE: Average learner in grades 5 through 8, with appropriate applications for handicapped, gifted, and culturally diverse children.

AWARD: Contract #300-80-0784 10/01/1980 to 9/30/1983 Cost: $779,233

The purpose of this project is to develop, test, and disseminate instructional microcomputer software designed to capitalize on the unique capabilities of the computer as an integral part of the mathematics program. TABS software focuses on the development of such important math skills as estimation, prediction, geometry, interpreting and problem-solving strategies which students frequently do not acquire successfully as a result of more traditional instructional methods. At the the same time the children are becoming computer literate by learning to use and program computers.

The computer (Apple II with one disc drive, 64K memory, and a color video monitor) demands a student's active participation in the learning experience. Computer-generated objectives can be moved around the screen or viewed from different angles. Graphics are used to provide the student with instant and accurate feedback.

In addition to microcomputer software, the project is developing teacher manuals, inservice workshop structures, and student support materials.

MAJOR PRODUCTS:
Set of microcomputer software
Teacher's Guide
Implementation Guide

PROJECT DIRECTOR:

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## MATHEMATICS NETWORK CURRICULUM PROJECT FOR MIDDLE SCHOOL TEACHERS AND STUDENTS

TARGET AUDIENCE: Middle school teachers and students

AWARD: Contract SED 80-12465 9/17/1980-2/28/1983 Cost $130,811

This project, for the introduction of microcomputers into the middle school mathematics curriculum, has three objectives: the development of seven curriculum prototypes (units), a model for the teachers, and the development/implementation of a computer communications system (network) to bring together the separate classrooms. The computer activities will stem from classroom activities that utilize the manipulation of real objects and/or the activities of the students themselves. Each unit incorporates five elements: games; simulations; classroom activities; data storage, retrieval and processing; and interclassroom interaction. Dynamic software will be developed to provide both structure and freedom for student manipulation of data and interaction with the mathematical content and concepts. The network will provide for interaction of students and classrooms with each other, teachers with each other, and all of these with the university data base. The interaction will enhance participation and motivation of both students and teachers. The project will disseminate information at professional meetings and will explore the possibilities of commerical publication of the materials.

MAJOR PRODUCTS: Prototype units and communications system

PROJECT DIRECTOR:

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## MICRO-MATH

TARGET AUDIENCE: Teachers and administrators of math students grades 7-9.

AWARD: Grant G008301532    11/1/83 to 10/31/87    Cost: $39,976 (first year)

MICRO-MATH is a mathematics/technology project which systematically integrates the microcomputer into the 7-9th grade classroom with a proven instructional curriculum. There are three critical needs in mathematics today: the need to teach students how to solve problems, the need to become computer literate, and the need to adapt to changing mathematics requirements in jobs. MICRO-MATH has integrated these three needs into a cost effective, easy-to-use curriculum which supplements and parallels the traditional 7-9th grade mathematics program. MICRO-MATH defines computer literacy as the student being able to: (a) understand how a computer works (b) develop a computer program in BASIC language, (c) use computer skills in problems associated with specific jobs, and (d) read and interpret computer output. The program can be readily adapted to a broad spectrum of established organizational structures and draws upon many modes of instruction. MICRO-MATH is designed to supplement the existing classroom program and parallel regular instruction.

Approved by the Joint Dissemination Review Panel, MICRO-MATH has received dissemination funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what MICRO-MATH offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. The MICRO-MATH teaching staff completes one and one-half days of training before implementing the program. The training provides indepth information and management techniques for program implementation. Project materials include a Teacher's Guide, MICRO-MATH Student Workbook, and microcomputers.

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# USING PROBLEM SOLVING IN JUNIOR HIGH MATHEMATICS

TARGET AUDIENCE: Junior high mathematics students

AWARD: Contract SED 80-24463 6/15/1981-5/31/1983 Cost $71,051

This project uses microcomputers for teaching problem-solving skills in mathematics in grades 7-9. Materials will be developed by experienced teachers who have developed computer software and use microcomputers in their classrooms. The project objectives include developing instructional packages for junior high mathematics, including simulations, inquiry activities; educational games; and programming materials.

The goal of the project is to develop materials which improve students' ability to solve real-life problems, use induction, work with algorithms, and think abstractly.

Commercial publication will be sought for materials produced by this project.

MAJOR PRODUCTS: Instructional software for junior high mathematics.

PROJECT DIRECTOR:

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# MICROCOMPUTER-BASED STRATEGIES FOR MATHEMATICS IN JUNIOR HIGH AND HIGH SCHOOL

TARGET AUDIENCE: Junior and senior high school mathematics teachers and students

AWARD: Contract SED 80-12649 8/01/1980-10/31/1982 Cost $88,800

This project will develop computer programs called IDP's (interactive demonstration programs) for use on microcomputers capable of generating high resolution video graphics to treat key topics in traditional junior high and high school mathematics courses--primarily general mathematics, algebra, geometry, and calculus. The programs will apply the technology to the tasks of computation, graphical display, and simulation in order to clarify and explain the subject matter. The classroom component of the project is complemented by a laboratory component in which students experiment individually with the programs and carry on related activities.

The primary product of the project will be the demonstration of a teaching model which makes use of computer programs for classroom demonstration and laboratory use in mathematics courses. The programs themselves, which will be available when the project is completed, will be designed to bring ideas and numbers together more effectively for the understanding of mathematical concepts and procedures, promote classroom participation by virtue of the interactive nature of the programs, provide multiple viewpoints and contexts for the treatment of the given topic, and allow for a useful redistribution of the teachers' time. Teachers from the Atlanta public school system will be actively involved in the planning and development of the IDP's to ensure their quality and effectiveness. A distribution network for the materials will be provided by the Southwestern Consortium for Minorities in Engineering. The project is designed for future expansion to other courses and grades and to a large geographical area.

MAJOR PRODUCTS: Interactive deomonstration computer programs and a teaching model.

PROJECT DIRECTOR:

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# ADAPTATION OF CURRICULUM MATERIALS FOR SPECIAL EDUCATION

TARGET AUDIENCE: Teachers of mildly handicapped mathematics students in secondary level regular and resource classrooms.

AWARD: #300-82-0320 9/01/1982 to 11/30/1983 Cost: $220,848

In an effort to reduce the shortage or lack of relevant and appropriate instructional materials for students who suffer from mildly handicapping conditions (mild mental retardation, learning disabilities, emotionally disturbed), four contracts were awarded to adapt existing curriculum materials for special education use. This particular contract's adaptation will involve a multiseries set of computer software to supplement three commonly used secondary math curricula (Addision-Wesley, Holt-Rhinehart-Winston, and Scott Foresman) that will be appropriate for teaching mildly handicapped individuals on a daily basis in secondary level regular and resource classrooms.

MAJOR PRODUCTS: Multiseries computer software and courseware to supplement three commonly used secondary math curricula (Addison-Wesley, Holt-Rhinehart-Winston, and Scott Foresman).

PROJECT DIRECTOR:

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# UTILIZING COMPUTERS IN THE TEACHING OF SECONDARY MATHEMATICS

TARGET AUDIENCE: Mathematic students of all skill levels, grades 9-12. Training available for high school mathematics teachers.

AWARD: Grant G008201707 9/1/82 to 8/31/86 COST: $67,888 (two years)

Utilizing Computers in the Teaching of Secondary Mathematics is a program of microcomputer-based instructional materials and techniques to improve mathematics skills in the areas of secondary level mathematics: General Mathematics, Algebra I, Algebra II, Geometry, Trigonometry, and Calculus. Using this approach, students are given the opportunity to experience computer simulations, tutorial exercises, and basic programming capabilities as they relate to the particular objectives for student achievement in both required and advanced math courses. The program uses 30 computer-based teaching units which are integrated into the existing curriculum. As an integral part of the daily lesson plan, the teacher provides an introduction to the topic and students are then instructed to access specific computer programs designed to apply the concept or skill that was the objective for the lesson, obtain detailed explanations of concepts or skills, or receive instructions as to how to proceed with independent investigations utilizing the information provided. Worksheets are generated as part of the computer program. Each unit and its objectives are easily cross-referenced to the text in use by page and skill area, thus making it possible for the instructor to identify and coordinate computer activities with regular course offerings.

Approved by the Joint Dissemination Review Panel, Utilizing Computers in the Teaching of Secondary Mathematics has received funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what the program offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up service are available. Software costs $100 and includes manuals for implementation, student testing materials, and the computer programs. Half-day training is required.

PROJECT DIRECTOR:

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# MICROCOMPUTER INSTRUCTIONAL UNITS (FOR 11TH AND 12TH GRADE MATHEMATICS) USING SIMULATION OF MATHEMATICAL MODELING

TARGET AUDIENCE: 11th and 12th grade mathematics students.

AWARD: Contract SED 80-12463 7/01/1980-6/30/1983 Cost $54,184

Three prototype instructional units will be developed for microcomputers, each using simulation of mathematical modeling as a vehicle with which students can explore the geometrical and physical bases of mathematical relationships. The simulation programs will employ color graphics (with a graphic input pad) to illustrate physical and geometrical processes. Students will use the programs as experiments, trying different parameters and conditions, in order to collect data and formulate conjectures. The program packages will permit students to test their conjectures for consistency with the simulations, and will suggest exploration of possible sources of error.

The materials will be tested in high school, college, and in adult continuing education classes. Each program package will be a self-contained instructional unit on some topic illustrating mathematics ordinarily encountered in grades 11 and 12. Each will be accompanied by a supplementary pamphlet suggesting problems, projects, and further reading.

MAJOR PRODUCTS: Simulation computer program packages

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# IMPROVING SPATIAL SKILLS IN PRE-COLLEGE MATHEMATICS THROUGH COMPUTER GRAPHICS

TARGET AUDIENCE: High school mathematics teachers and students with a special research focus on women.

AWARD: Contract SED 80-12633 8/15/1980-7/31/1982 Cost $133,817

This project will develop and test experimental educational materials intended to improve mathematical problem solving by training in spatial visualization and orientation. Spatial skills have been shown to be good predictors of mathematical performance and grades in mathematics courses and to be important in certain occupations. Among modern technologies, computer graphics has special potential as a tool in spatial visualization and orientation training. This project will develop and produce software (which will be available at the end of the project) to generate a variety of instructional courseware. Students will interact with subject matter using individual computer graphics systems. The computer programs will evaluate student responses and adapt the training sequence. Moreover, this software will enable teachers to design new training experiences without special knowledge of computing. Testing of materials will be done at a public and private high school. Pre and post-training testing of spatial and mathematical abilities will be administered to experimental and control subjects. Since sex differences in spatial abilities have been reported widely, the project will compare the changes in spatial skills shown by males and females.

The project includes a Small College Faculty Research Supplement to enable Dr. Ruth Murray, Chair of the Mathematics Department of Russell Sage College, to continue her research in the learning of mathematical spatial concepts and in math anxiety and avoidance in women.

MAJOR PRODUCTS: 12 instructional modules, associated computers software and a research report

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Edith H. Luchins<br>Rensselaer Ploytechnic Institute<br>Mathematical Sciences Department<br>Troy, New York 12181<br>(518) 270-6345 | Patricia A. Butler<br>National Institute of Education<br>Program on Teaching and Learning<br>1200 19th Street, N.W.<br>Washington, D.C. 20208<br>(202) 254-5706 |

## A COMPUTER GRAPHICS LEARNING ENVIRONMENT FOR HIGH SCHOOL TRIGONOMETRY

TARGET AUDIENCE: High school trigonometry students.

AWARD: Contract SED 80-24474 5/15/1981-3/30/1983 Cost $149,799

This project will create a learning environment for high school trigonometry based on microcomputer color graphics units. Students can explore these units on their own or under the direction of a teacher.

These user-oriented materials will be written so that they are highly visual in character, and they will encourage browsing among the lessons rather than requiring the student to adhere to a predefined path.

The primary audience of the materials is the high school academic mainstream. High school teachers are part of the development team, and the materials will be tested in two local high schools. A special effort will be made to assure that the materials are attractive to women students.

The product of the effort will be a number of interactive color graphics units, documented and tested, which can be used in learning trigonometry. For wide distribution to potential users, these materials will be submitted to CONDUIT and MicroSHIFT (a clearinghouse for pre-college computer-based materials supported by the National Institute of Education).

MAJOR PRODUCTS: Interactive color graphic units

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Eugene A. Klotz<br>Swarthmore College<br>Swarthmore, Pennsylvania 19081<br>(215) 447-7246 | Patricia A. Butler<br>National Institute of Education<br>Program on Teaching and Learning<br>1200 19th Street, N.W.<br>Washington, D.C. 20208<br>(202) 254-5706 |

# GRAPHING IN HIGH SCHOOL LEVEL ALGEBRA AND TRIGONOMETRY FOR ADULTS

TARGET AUDIENCE: High school and adult algebra and trigonometry students.

AWARD: Contract SED 80-12447 7/01/1980-12/31/1982 Cost $55,494

A software package of 15 to 20 graphing lessons intended for use on a computer graphics terminal will be developed by three members of the Mathematical Science Department at Virginia Commonwealth University. This package will be used by students on an individual and personalized basis with the help of a qualified teaching assistant. The software will augment existing course in elementary algebra, intermediate algebra and trigonometry. The content of these courses is the same as that found at grade levels 10 through 12. Each lesson in the software package will be written so that the student is an active participant in the graphic process.

Appropriate testing will take place at each stage of development to insure the effectiveness of the graphing lessons. When the software is complete, a control group and an experimental group will be selected from among the groups of students of age 25 and over. Both student achievement and attitude will be assessed. Guidelines established by CONDUIT will be used as a basis of project organization and management. The software and the new knowledge which result from the project will be disseminated.

MAJOR PRODUCTS: Sotware package of 15-20 graphing lessons

PROJECT DIRECTOR:

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# TEACHING EXPERIMENTIAL APPLIED MATHEMATICS

TARGET AUDIENCE: Departments of mathematics and their students in 2-year colleges, 4-year colleges, and universities in the United States

AWARD: Grant G0083-02539 7/01/1983-6/30/1986 Cost: $295,650

There is a national need for learning and teaching materials which require students to use the full spectrum of resources available to them on their college campus. This project will offer college instructors a strategy for teaching students to use the full extent of their reasoning, writing, and mathematical abilities, making them realize, perhaps for the first time, that these skills are interconnected rather than separated.

To meet these needs, this project proposes to produce, disseminate, and evaluate six applied mathematics learning modules utilizing the technology of communications. Each learning module will provide the student with learning materials, and the instructor with a strategy for an experimential discovery-learning teaching approach. Each learning module will focus upon an applied mathematics problem as it was encountered, in raw form, in industry. It will consist of a video cassette which introduces the problem in raw form using on-site video; a student resource book; a teacher resource book; a completely documented microcomputer software package on a diskette; and a second "sum up" video cassette which presents the industrial solution of the problem to the student.

MAJOR PRODUCTS: Six applied mathematics learning modules

PROJECT DIRECTOR:

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## A PROGRAM IN QUANTITATIVE DECISION MAKING FOR THE FIRST TWO COLLEGE YEARS

TARGET AUDIENCE: College undergraduate students.

AWARD: Grant G0081-02312 9/15/1981-12/15/1983 Cost: $122,112

This project will result in the development and implementation of a new, multidisciplinary program in the quantitative foundations of decisional analysis. It is intended for students from the social, mathematical, physical, biological, and management sciences. The program is directed towards the first two undergraduate college years and will serve the needs of students and their instructors interested in the applications of quantitative methods of decision making in business, education and science.

The twenty-seven month project will involve curriculum design; development of appropriate classroom materials; integration of the use of microcomputers into the curriculum; hands-on computer use; the assembly of a computerized data base and retrieval system covering micro-computer-based software developments in relevant disciplines; summer internships in local research and operating enterprises for selected students; intensive summer short-courses for college teachers from other institutions to disseminate the program as it is developed.

MAJOR PRODUCTS: Classroom materials including computer software

PROJECT DIRECTOR:

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# VOYAGE OF THE MIMI: A MULTIMEDIA SCIENCE AND MATH PROGRAM

TARGET AUDIENCE: Upper elementary school students at approximately the 4th and 6th grade levels; purpose--science and math exploration/challenge; contains appropriate materials for diverse cultures and abilities.

AWARD: Contract 300-81-0375 10/01/1981 to 9/30/1984 Cost: $2,649,101

The project is developing a motivational, television adventure series of 13 dramatic 15-minute segments and 13 related documentary 15-minute segments designed to present science and math concepts which will be explored in depth in classroom activities. In addition, complementary microcomputer and interactive microcomputer/videodisc programs are being produced. Goals for the project are:

- to enhance children's understanding of science, mathematics and technology;
- to help children master principles of the scientific method which they can apply to their own investigations;
- to help children recognize how science and technology can be used to solve problems they encounter;
- to help children understand what scientists do and to consider careers in science and technology for themselves;
- to foster an interest in science among boys and girls from all backgrounds;
- to provide teachers with a model of how to integrate the microcomputer with the classroom curriculum, particularly in science and mathematics; and
- to provide teachers with a new model of science and mathematics education, incorporating new technology as both content and process.

The dramatic focus of the series is a summer expedition on a sailing vessel in which a group of young people from diverse backgrounds follow the migration of whales from the coast of Maine to the Newfoundland Banks. Underlying the drama is an interdisciplinary approach to the subjects of communications, energy, ecology, measurement, process of change, and fundamentals of structural engineering. Classroom microcomputer simulations challenge students to tackle many of the same problems as the crew of the Mimi. Microcomputers are also used for experiments; data collection, analysis, and graphing, as well as for puzzles and games.

Formative research is being applied to development of the series and accompanying materials. Criterion-referenced evaluation of two pilot shows and supplementary materials has been undertaken in two sites.

MAJOR PRODUCTS: 26, 15-minute television shows; complementary microcomputer software programs; developmental microcomputer/videodisc interactive program; supplementary print materials.

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## COMPUTER STORYTELLING MATHEMATICS FOR PUEBLO INDIAN UPPER-ELEMENTARY LEVEL STUDENTS

TARGET AUDIENCE: Upper-elementary level Pueblo Indian mathematics and science students.

AWARD: Contract SED 80-12482 9/19/1980-2/28/1982 Cost $59,444

This project will develop an alternative, computer-based learning unit in mathematics and science for upper-elementary level Pueblo Indian students. The project will produce and field test a four- to six week unit entitled "Pueblo Uses of Energy" which fuses mathematical problem solving with science content related to the daily lives of the Pueblo students. The major role of instruction will be the micro-computer interfaced with a tape recorder. Instructional programs will be designed to introduce content and skills in a storytelling format which capitalizes on a specific learning style of Pueblo culture.

The project will be accomplished in two 6-month phases: 1) design and 2) field development, revision and dissemination. The computer programs, audio tapes, and printed materials developed will be disseminated through the Education Division of the All Indian Pueblo Council to Bureau of Indian Affairs schools and other educational programs. Materials will also be available at the American Indian Bilingual Education Center at the University of New Mexico. Results of the project will be presented in journal publications.

MAJOR PRODUCTS: Computer-based learning unit in mathematics and science

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## MIDDLE SCHOOL MICROCOMPUTER STATISTICS LABORATORY

TARGET AUDIENCE: Middle school students.

AWARD: Contract SED 80-24417 5/15/1981-4/30/1983 Cost $10,035

The primary objective of the project is to create an environment in which middle school students will have the opportunity to develop a sense of statistical reasoning as an integral component of problem solving in science and mathematics. A statistics laboratory will be created in which students will receive instruction in statistics and assistance in applying statistical techniques in science, social studies, and other areas of study. The microcomputer will be used as a tool to solve these statistics problems. The project will generate a low-cost model with supporting courseware, competency statements, and guidelines for instruction and evaluation of hardware and software. Commercial publication of the materials produced in the project will be sought.

MAJOR PRODUCTS: Model microcomputer statistics laboratory

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# STRENGTHENING OPPORTUNITIES FOR HIGHLY ABLE YOUNG WOMEN IN MATHEMATICS, SCIENCE, AND COMPUTERS

TARGET AUDIENCE: Junior high school girls

AWARD: Grant #G00-83-03390 10/01/1983-9/30/1984 Cost: $68,116

The purpose of this project is to increase the participation of junior high school girls in math, science, and computer training through a math/science career conference, mentorship placement, business tours, hands-on computer workshops, and math equity awareness training for students, teachers, counselors and parents. The project expands an existing partnership between business and education in the Puget Sound area into a comprehensive program designed to increase the participation of highly able young women with talent in mathematics and science, since attitudes and interests formed at this vulnerable stage have important implications for course selection in high school and college, and for ultimate career development. The project will establish a Math/Science Equity Resource Center at Educational Service District No. 121. The hands-on computer training will be for junior high girls and their parents.

MAJOR PRODUCTS: Demonstration model, catalog, newsletter

PROJECT DIRECTOR:

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Women's Educational Equity
Act Program
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## PROJECT BICOMP

TARGET AUDIENCE: Limited English Proficient Students in grades K-3

AWARDED: Grant G00-83-1744 8/01/1983 to 7/31/1986 Cost: $450,000

The purpose of the project is to develop, implement and evaluate a science based computer assisted instruction program. The project will test the effectiveness of the approach using 4 different methodologies: 1) Computer Simulation in peer groups; 2) Computer simulation on an individual basis; 3) interactive computer activities in groups; 4) interactive computer activities on an individual basis. The project will analyze the achievement results of students in each group to determine which of the 4 is most effective.

Teachers will be trained in both computer literacy and methods of providing C.A.I.

The project uses Apple II microcomputers with 64K memory.

MAJOR PRODUCTS: Dissemination Packet and instructional guide; Evaluation report; Program brochure.

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## ADAPTATION OF INSTRUCTIONAL MATERIALS FOR USE WITH MAINSTREAMED STUDENTS

| | |
|---|---|
| TARGET AUDIENCE: | Mainstreamed handicapped elementary health students, regular and resource teachers. |

AWARD: #300-83-0266 10/01/1983 to 12/30/1984 Cost: $246,853

This federal investment is designed to continue to stimulate the private sector to modify existing instructional textbook systems to be more appropriate for a wide range of student abilities and learning styles. This procurement is part of an overall Special Education Programs effort to promote modification of existing instructional texts when that is the most cost-effective and timely strategy for improving the availability of appropriate instructional media and material for the mainstreamed handicapped students. This procurement is also designed to have an impact in the immediate future on the quality of instruction provided both secondary and elementary aged handicapped children by improving the appropriateness of the health texts being used to educate these children on a daily basis in regular and resource classrooms. This project will adapt a strand of four units of an elementary school science text, D.C. Heath's Health Science into CAI with probes and simulation activities.

| | |
|---|---|
| MAJOR PRODUCTS: | Computer software, courseware, and interface mechanisms (such as thermometers) for experiments and simulation, teachers' manual. |

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## EDUCATION AND HIGH TECH/PROJECT CREST (COLLABORATIVE RESULTING IN EFFECTIVE STUDENT-INTERACTIVE TECHNOLOGY

| | |
|---|---|
| TARGET AUDIENCE: | Physical science students at the junior high/middle school level having different interests, needs, social backgrounds, and learning styles. |

AWARD: Grant #G00-83-03363 1/01/1984 to 12/31/1985 Cost: $159,100

Project CREST will develop, test, evaluate and disseminate a computer/video based physical science unit for Digital Equipment Corporation's Interactive Video Information System (IVIS) to use this technology to improve student learning and problem solving in Physical Science at the junior high/middle school level. The core of this unit is computer based and software driven. It will be developed using Digital designed "authoring tools" and a VAX 11/780 main frame computer. This design will allow delivery of Digital's IVIS which uses a PC 350 Professional Computer with high resolution RGB (red-green-blue) monitor and stereo audio amplifier as its base system. The concepts of force, energy, and work will be employed to teach students how to analyze a word problem, translate that word problem into an algebraic equation, substitute appropriate variables into that equation and ultimately solve it.

Project Crest is unique in that it builds on an already established inter-district and industry education collaborative. It should improve student learning in mathematical problem solving and reading comprehension through the content of the physical sciences.

The first phase of Project CREST will focus on extended teacher training, development and administration of a needs assessment, design and production of the unit and accompanying support materials. Phase two will focus on field testing, training of additional teachers, evaluation, demonstration, and dissemination of materials.

MAJOR PRODUCT:
- Set of IVIS software and video disc
- Teacher's Guide
- Implementation Guide for IVIS hardware and software
- Self-paced handbook

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## COORDINATED USE OF MICROCOMPUTERS IN HIGH SCHOOL CHEMISTRY, PHYSICS, BIOLOGY, AND MATHEMATICS

TARGET AUDIENCE: High school science students.

AWARD: Contract SED 80-24473 4/15/1981-2/28/1983 Cost $78,857

This project seeks to improve the teaching of high school mathematics by developing prototype microcompter-based materials which show the application of mathematics to chemistry, physics, and biology, and which enhance the teaching of selected mathematics concepts through the use of computer graphics. Students will use microcomputers to apply, in the science laboratory, principles learned in the mathematics classroom. The specific materials to be developed are: (1) software for a graphic package to be used in mathematics classes and science laboratories; (2) nine packages of experiments (three each in chemistry, physics, and biology), consisting of software and courseware (i.e., documentation, workbooks) which permit use of the microcomputer to process experimental data using graphics; (3) a mathematics package consisting of software and courseware dealing with topics in the high school mathematics curriculum for which graphics treatment is particularly appropriate. Students will be able to use these materials without any previous computer experience.

The graphics package will consist of a family of interactive programs basic to the other materials. It will be able to plot experimental data points, plot curves from user supplied equations, calculate numerical approximations to experimental data, and display the calculated curve, data points, and possibly another theoretical curve, all on the same screen. The early portion of the mathematics package will treat the topics of the graphing of experimental data, the types of experimental errors, and the numerical approximations of experimental data. In the science laboratory the microcomputer will be able to receive experimental data via a graphics tablet or A/D converters, and to process the data using the graphics package in the manner discussed in the math classroom.

MAJOR PRODUCTS: Prototype microcomputer-based materials which show the application of mathematics to science courses

PROJECT DIRECTOR:

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## MICROCOMPUTER PROGRAMS FOR TEACHING INTRODUCTORY PHYSICS: LAWS OF MOTION EXPERIMENTS

TARGET AUDIENCE: High school and college students in introductory physics courses.

AWARD: Institutional Grant NIE-G-83-0004 12/01/1982-11/30/1984
Cost: $267,424

The Science Learning Project focuses on problems in learning introductory physics, primarily in learning principles governing the laws of motion. Findings from this work are the foundation for the development of a series of microcomputer programs designed to assist students in gaining a firm understanding of the basic concepts of classical mechanics. The programs simulate experiments with the inclined plane, free fall, and the A-machine to discover and test motion concepts. Variables include: mass of the block and bucket, angle of the inclined plane, friction, and net force. Results are displayed in (1) normal and slow motion, (2) still "snapshots" at equal time intervals, (3) graphs, and (4) data tables. Students can test hypotheses quickly from experimental results and sharpen graph and data interpretation skills simultaneously. Concept mastery is further achieved by allowing students to test alternative ideas about motion by contrasting the motion of objects in both the Aristotelian world--where heavier objects fall faster--or in the Newtonian world, with and without friction.

MAJOR PRODUCTS: Two computer simulation programs on separate diskettes, available for both the Apple II and TRS-80 Models I and II from EME Company, P.O. Box 17, Pelham, New York 10803.

PROJECT DIRECTORS:

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# USING TECHNOLOGY TO IMPLEMENT PHYSICS RESOURCES AND INSTRUCTIONAL STRATEGIES FOR MOTIVATING STUDENTS (PRISMS)

TARGET AUDIENCE: Physics teachers and high school physics students from 48 schools in Iowa where teachers have a marginal background in physics. The project has applications for most secondary school science classes and instructors.

AWARD: Grant #G00-83-3402 1/01/1984 to 12/31/1984 Cost: $132,085

This project was initially designed to develop competence for physics teachers who had a marginal background in physics, but expanded to develop a general teacher's guide, PRISMS, which coordinates high-interest student activities relating with teaching strategies based on current research in physics teaching. The learning cycle blends exploratory activities, concept development and application activities to stimulate problem-solving skills as well as understanding major concepts of physics.

Microcomputer software has been evaluated and adapted into the teaching strategies by writing student and teacher instructions so that maximum value is attained from the programs. Videotapes are being developed to bring phenomena into the classroom for exploration as well as analysis that are not normally available to high school students.

Microcomputers from participating schools will be networked with an IBM XT in the project office. Teachers may transmit questions and feedback on experimental activities so that texts can be edited and immediately updated by means of a word processor. Also, data may be recorded from an experiment in one location (such as solar home monitor) and then transmitted to the other participating schools via modems and telephone hookups.

Instructional materials in physics have been developed for videodisc interfaced with microcomputer systems and will be piloted in some of the participating schools.

MAJOR PRODUCT: PRISMS, teacher's guide, student and teachers' instructions for service.

PROJECT DIRECTORS:

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# AN EDUCATIONAL DATA ACQUISITION SYSTEM FOR USE IN SECONDARY SCIENCE COURSES

TARGET AUDIENCE: Students in secondary and junior college science classes.

AWARD: Small Business Innovation Research Program 10/1983 to 4/1984
Cost:

CREARE R&D, Inc. will design a complete Educational Data Acquisition System (EDAS) that includes instrumentation, hardware, and software for a series of experiments to be run on microcomputers in secondary school science laboratories. In its simplest form, this system will provide the teacher and students a general purpose "linkage" between physical processes and a microcomputer. However the system will also contain specially designed experiments to teach physical concepts to the student using simplified forms of real life situations encountered by professional scientists, engineers and programmers. The experiments will emphasize fundamentals such as the correct way to take measurements, control experiments and evaluate experimental uncertainty. Using the computer to record experimental data also increases student interest, and the EDAS will exploit this interest through interactive software and sequenced stages of tasks of increasing difficulty. The EDAS will challenge gifted students and expose all students to marketable technical skills.

Of major concern in the design of the system is that it supply to physical concepts being taught in the secondary science classroom, foster excellence and interest in the physical sciences, be modularized so it can easily adapt to a variety of experiments and kinds of measurements, and be low cost and easy to use.

MAJOR PRODUCTS: A low cost, computer-based, turn-key system that is useful in a variety of secondary school and junior college science classrooms, contains relevant scientific experiments and is geared to students of different abilities.

PROJECT DIRECTORS:

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CREARE R&D, Inc.
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(603) 643-3800

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Educational Policy and Organization
Educational Finance
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# TEACHING OPTICS BY PHOTON STATE SIMULATION: AN EXAMPLE OF HOW PERSONAL COMPUTERS MAY BE USED TO IMPROVE PHYSICAL SCIENCE PEDAGOGY

TARGET AUDIENCE: Physical science students from junior high through graduate school

AWARD: Grant G0083-02534 9/1/1983-8/31/1984 Cost: $61,500

A software package for personal computer will be developed that will provide an efficient and economic improvement in modern optics education, particularly as it relates to advancing laser and optical fiber technologies. The program will allow students at every level from junior high to graduate school to simulate and investigate a wide range of optical phenomena on the screen of the monitor that would otherwise require a very expensive laboratory. The program will also allow students to access the theory at every level by employing a specially adapted language. The product will be thoroughly tested at every stage of development in diverse environments and disseminated via workshops, conferences, and direct circulation.

The program will be tested on students of varying levels of maturity in physics and mathematics at the University of Maryland and the University of the District of Columbia.

MAJOR PRODUCTS: A software package for optics education

PROJECT DIRECTOR:

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# COMPUTER BASED LEARNING MATERIAL TO HELP RETAIN STUDENTS IN BEGINNING PHYSICS CLASSES

TARGET AUDIENCE: Beginning science and engineering students in community colleges, colleges and universities. Junior high and high school students

AWARD: Grant G0082-00987 7/01/1982-6/30/1985 Costs: $318,240

Serious problems exist in science and engineering education for both specialists and for the general population. Women and minorities have particular problems in science and mathematics. Of particular interest are students who are having difficulty with the beginning physics course and are therefore potential dropouts, not only in this course, but from all science and engineering courses. This proposal suggests the development and evaluation of computer based learning materials to aid students toward success in beginning physics courses at the high school and college levels. These highly interactive materials will be individualized to the needs of each student. The materials proposed might be used within a course or might be employed by students in a variety of other learning environments. The dialogs produced will be self-contained, so they can be used alone. The 14 units developed will be based on recent research, indicating the nature of learning difficulties for students. Widespread commercial distribution is planned in both formal schools and informal learning environments, so the material will have great impact.

MAJOR PRODUCTS: Fourteen computer based units for beginning physics

PROJECT DIRECTOR:

Alfred Bork
Educational Technology Center
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Irvine, California 92717
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# SEATTLE CENTRAL COMMUNITY COLLEGE--COMPUTER BASED INSTRUCTION

TARGET AUDIENCE: Community College students enrolled in both vocational and liberal arts courses. When fully operational, approximately 1,700 students per year will be involved in the activity.

AWARD: G00-82-02184 10/01/1982 to 9/30/1984 Cost: $216,771

This activity includes three major areas: 1) Application of computers into four new curriculum areas, 2) computer-managed instruction, and 3) development of computerized instruction into new areas. The focus of this project will be the four new curriculum areas. The first project will establish a computer-based printed circuit board drafting curriculum. A committee has been formed to direct its development. Equipment to support the program will be purchased. The second program application will upgrade the architectural, civil, and mechanical drafting programs through development of computer-based drafting and the purchase of supporting hardware and software. In service training for drafting faculty will be provided using outside consultants and college staff. The third application is to upgrade the machine shop curriculum to encompass computer numerical control. The current numerical control equipment will be interfaced to an appropriate computer. The curriculum will be revised to incorporate training in use of the modified equipment. Updating this curriculum will make students more competitive in the machinist job market. The fourth application will incorporate computer use for data analysis, data collection, and experiment control into science laboratory courses. Faculty members will be trained in new computer uses and will then develop computer-based laboratory activities.

MAJOR PRODUCTS: Computer software

PROJECT DIRECTOR:

David Moseley
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## ENCOURAGING UTILIZATION AND APPLICATION OF VIDEO-DISC/COMPUTER TECHNOLOGY THROUGH THE DEVELOPMENT OF A COLLECTION OF HIGH-QUALITY TEACHING VISUALS FOR BIOLOGICAL SCIENCES

TARGET AUDIENCE: College biology students.

AWARD: Grant G0082-03114 Sept 1, 1982 - Aug. 31, 1984 $97,151

A video-disc containing 6,000 single-frames of high quality, carefully edited visuals plus several motion sequences has been produced to support biology instruction. Each frame is fully documented and representative of the complete field of biological sciences. The versatility of the disc will allow its use as a simple slide collection in support of traditional instruction, or as the heart of sophisticated Computer Assisted Instruction (CAI). We believe that the production of high-quality, educational software which is broad and comprehensive in content, flexible in application, and low in cost, will find rapid adoption in universities, community colleges, and high schools throughout North America. With the hardware and software in place, a program of workshops to develop skills in the development and utilization of CAI lessons for instructors in the biological sciences will be conducted to increase the impact of the videodisc technology, especially in regard to intelligent use of the disc in interactive CAI programs.

MAJOR PRODUCTS: A video disc to support biology instruction

PROJECT DIRECTOR:

D. Joseph Clark, Director
Biological Science Videodisc Project
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Bellevue Community College
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Bellevue, Washington 98007
(206) 641-2200

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# IMPROVING SCIENCE EDUCATION VIA PERSONAL COMPUTERS

TARGET AUDIENCE: College students and instructors of science

AWARD: Grant G0082-00967 10/01/1982-9/30-1985 Cost: $325,680

Science education in the classroom, home and workplace will be improved by developing and disseminating computer-based modules within the framework of complete, cohesive courses, in four disciplines (tentatively, biology, chemistry, physics, psychology). Committees in each discipline will establish a framework, and teams of authors will develop materials in coordination. Dissemination will be via existing CONDUIT channels, and the marketing organization of one or more commercial publishers. Publishers will also contribute to the support of materials preparation. It is estimated that each of the twenty or more modules that are produced will be used by 10,000 to 15,000 students at 200 to 300 institutions.

MAJOR PRODUCTS: Courseware in biology, chemistry, physics and psychology.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Harold J. Peters, Director<br>CONDUIT<br>P.O. Box 388<br>Iowa City, Iowa 52244<br>(319) 353-5789 | Stephen C. Ehrmann<br>Fund for the Improvement of Postsecondary Education<br>400 Maryland Avenue, S.W.<br>Washington, D.C. 20202<br>(202) 245-3091 |

# A KNOWLEDGE BASED INFORMATION SYSTEM IN PATHOLOGY

TARGET AUDIENCE: Students in the medical and health professions

AWARD: Grant G0083-02816 7/01/1983-6/30/1986 Cost: $262,171

Over the past three years we have developed a computerized knowledge management system that superimposes some of the features of computer-assisted instruction and some of the features of a communication network on a more or less conventional medical textbook. An improved version of the existing Living Textbook of Pathology will be transferred to a state-of-the-art micro-computer in order to make it more widely accessible. One of the well established techniques of artificial intelligence, a semantic network, will then be used to (1) facilitate access to the information contained, (2) support the automatic linking of new information to the proper places in the text as it comes on line and (3) support the interactive growth of the medical information it contains.

MAJOR PRODUCTS: A model computerized pathology textbook

PROJECT DIRECTOR:

Don Thursh
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University of Illinois
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(217) 333-2986

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## SEATTLE SCHOOL DISTRICT BILINGUAL CAI PROJECT

TARGET AUDIENCE: Limited English Proficient Students in grades 9-12 whose native language is Laotian, Vietnamese or Hmong

AWARD: Grant G00-83-01500 7/01/1983 to 6/30/1986 Cost: $510,000

The project proposes to develop a CAI program to teach recent immigrants U.S. history. Concepts will be provided first in the students' native language in the classroom. Reinforcement will be provided by CAI in English. CAI will also include drill and practice and tutorial exercises in English vocabulary related to U.S. history materials.

Computers will also be used to provide instruction to students in basic computer literacy. The justification for using CAI is to provide immediate, nonpartial feedback and to increase motivation. The project will also use computers' documentation capability to record and evaluate student progress.

Other CAI modes of instruction include: gaming, simulation, dialoguing.

The project plans to use Apple IIe microcomputers with 65K memory.

MAJOR PRODUCTS: Evaluation report; develop CAI modules of U.S. history.

PROJECT DIRECTOR:

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## ADAPTATION OF INSTRUCTIONAL MATERIALS FOR USE WITH MAINSTREAMED STUDENTS

TARGET AUDIENCE: Mainstreamed handicapped high school social studies students, regular and resource teachers, parents

AWARD: #300-83-0265 10/01/1983 to 12/30/1984 Cost: $241,209

This federal investment is designed to continue to stimulate the private sector to modify existing instructional textbook systems to be more appropriate for a wider range of student abilities and learning styles. This procurement is part of an overall Special Education Programs effort to promote modification of existing instructional texts when that is the most cost-effective and timely strategy for improving the availability of appropriate instructional media and material for the mainstreamed handicapped students. This procurement is also designed to have an impact in the immediate future on the quality of instruction provided both secondary and elementary aged handicapped children by improving the appropriateness of the texts being used to educate these children on a daily basis in regular and resource classrooms.

This project will adapt a high school history text, Ginn and Company's A History of the United States into CAI software and courseware.

MAJOR PRODUCTS: Student workbook and CAI software prototype, teacher (history and resource) guides, parent guide.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Ruth MacDonald<br>Education Development Center, Inc.<br>55 Chapel Street<br>Newton, Massachusetts 02160<br>(617) 969-7100 | Jane Hauser<br>Office of Special Education and Rehabilitative Services<br>Special Education Programs<br>Technology and Marketing Branch<br>400 Maryland Avenue, S.W.<br>Washington, D.C. 20202<br>(202) 732-1126 |

# ADAPTATION OF INSTRUCTIONAL MATERIALS FOR USE WITH MAINSTREAMED STUDENTS

TARGET AUDIENCE: Mainstreamed handicapped high school students, regular and resource teachers.

AWARD: 300-83-0264 10/01/1983 to 12/30/1984 Cost: $241,209

This federal investment is designed to continue to stimulate the private sector to modify existing instructional textbook systems to be more appropriate for a wider range of student abilities and learning styles. This procurement is part of an overall Special Education Pprograms effort to promote modification of existing instructional texts when that is the most cost-effective and timely strategy for improving the availability of appropriate instructional media and material for the mainstreamed handicapped students. This procurement is also designed to have an impact in the immediate future on the quality of instruction provided both secondary and elementary aged handicapped children by improving the appropriateness of the texts being used to educate these children on a daily basis in regular and resource classrooms.

This project will adapt a senior high school world history text, Ginn and Company's, Our Common Heritage.

MAJOR PRODUCTS: Audio cassettes, software, computerized instructional management system.

PROJECTS DIRECTOR:

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MACRO Systems, Inc.
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# IMPROVING UNIVERSITY STUDENTS' UNDERSTANDING OF ENVIRONMENTAL DYNAMICS THROUGH AN ENVIRONMENTAL SIMULATION LABORATORY

TARGET AUDIENCE: Undergraduate and graduate students in geography and environmental sciences and their faculty

AWARD: Grant G0083-02739 8/16/1983-8/15/1985 Cost: $131,094

The following four problems related to education in the environmental sciences will be addressed: 1) static teaching of dynamic environmental processes, 2) restriction of computer assisted instruction to small classes, 3) lack of CAI in geography and environmental science modules and 4) the "teaching-as-taught" syndrome among doctoral students.

Through the Environmental Simulation Laboratory (ESL) CAI modules will be developed. A screen projection monitor will be employed to open up large lectures (introductory courses) to CAI and the efficacy of this will be tested. Every effort will be made to expand significantly upon the relevant CAI modules in circulation. These efforts will be augmented by the first systematic adaptation of generally available research computer models which are at the present not suitable for instruction, and the production of a cross-referencing system relating modules to recognized texts in various fields.

Local benefits accruing from this project include improved undergraduate and graduate education in the environmental sciences and graduate experience in CAI development.

The modules will be made available for use in all relevant teaching programs throughout the nation and demonstrations of the Electrohome system and ESL will be conducted at various workshops.

MAJOR PRODUCTS: Instructional modules

| PROJECT DIRECTORS: | ED. DEPT. CONTACT PERSON: |
|---|---|
| David M. Sharpe, Associate Professor<br>Colin W. Prowse, Assistant Professor<br>Department of Geography<br>Southern Illinois University<br>Carbondale, Illinois 62901<br>(618) 536-3375 | Jay Donahue<br>Fund for the Improvement<br>of Postsecondary Education<br>400 Maryland Avenue, S.W.<br>Washington, D.C. 20202<br>(202) 245-8100 |

# AN EXPERIMENTAL PROGRAM INCORPORATING MICRO COMPUTERS INTO UNIVERSITY CURRICULA

TARGET AUDIENCE: Undergraduate students and faculty

AWARD: Grant G0083-02729 6/30/1983-6/30/1984 Cost: $31,330

The purpose of this study is to experiment with different methods of incorporating micro computers into a college curriculum. Macroeconomics will be taught to a class of thirty students using 15 Commodore computers. Because commercially available software will be exclusively utilized (VISACALC), most educators could readily adopt and modify the experiences gained through this experiment. The exercises will be developed according to the following guidelines: focus on a *few* important issues; get the students to *imagine* the role of the important decision makers; focus on the *logic* of a decision; explore how *variations* in assumptions affect the results; *relate* the students' choices to formal theory; *reinforce* the point that formal theory is often an abbreviated version of the more complex role worked out by the student; and *relate* the formal theory to actual behavior.

The effectiveness of various approaches will be evaluated by testing students' retention as well as their ability to apply the material learned to new situations. The results will be disseminated through several channels including professional meetings, journals and possibly a paperback book.

MAJOR PRODUCTS: Journal articles, a possible book

PROJECT DIRECTOR:

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# COMPUTER ASSISTED MUSIC THEORY TEACHING

TARGET AUDIENCE: College students taking an introductory course in Music Theory.

AWARD: Grant G0081-02542 10/1/81 - 9/30/84 Cost: $148,629

The School of Music at the University of Kentucky has recognized the existence of a number of problems regarding instruction in music theory. Although recognition of these problems has occurred in a local context, there is a consensus among theory teachers at other institutions that these instructional problems are widespread. These problems include widely-varying acquaintance on the part of beginning theory students with musical notation, elements, and structures; disparity of achievement levels of these students in theory courses, particularly due to wide variance in quickness to learn musical hearing skills; insufficient instructional personnel and consequent low faculty morale; and inadequate levels of student motivation. Past attempts to deal with these problems have not proven completely successful.

To alleviate the problems above, a major project for curricular revision is proposed, which includes modular instructional design, flexible use of instructional personnel, state-of-the-art computer technology, and tape cassette programs. The project will last thirty months, and entails curricular revision activities, implementation of restructured curriculum into course taken by students, and formative and summative evaluation of project activities and outcomes. Curricular revision activities include restructuring of courses into modular components, production of programmed listening cassettes, and generation of a computer-assisted component for the curriculum. Instructional activities for students include learning through the above means, and seeing instructors on a flexible basis (fewer large class meetings, plus scheduling of individual and small group meetings with instructors). Daily record-keeping and timely formative evaluation will take place throughout the project, as will summative evaluation at its conclusion.

Intended outcomes include alleviation of instructional problems caused by divergent student preparation and learning quickness, more efficient and cost-effective use of faculty, improved faculty morale and relations with poorly-prepared students, and an increase in student motivation. Local benefits outside the university, such as demonstration of advantages of instructional computers and modular course organization, are envisioned.

MAJOR PRODUCTS: Courseware and other course materials.

PROJECT DIRECTOR:

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## COMPUTER ENHANCED INSTRUCTION--SCHOOL OF BUSINESS

TARGET AUDIENCE: Students in the School of Business with an interest in computer science.

AWARD: G00-82-98183 10/01/1982 - 9/30/1983 Cost: $352,168

This activity consists of a complex network of components which will include faculty development, improvement of student abilities, the implementation of an information system curriculum, and computer assisted instruction in each of the School's major degree programs.

The development of the computer related programs during the Title III, Part B grant period includes the following:

1. To provide faculty development in computer utilization to include applications relating to specific disciplines.
2. To develop a business skills program which will provide 100 percent of the students in need of assistance with training in the highly specialized languages of business.
3. To develop and test a computer augmented information systems curriculum.
4. To develop and test the school curricula to include computer usage and augmentation.

MAJOR PRODUCTS:

| | |
|---|---|
| (10) | microcomputer/terminals and terminals |
| (60) | work station stands for PST-100 terminals |
| (2) | letter quality printers with feeders and stands |
| (1) | air conditioner for CPU cooling |
| (1) | high performance multi-line controller |
| (7) | modems, 300/1200 hand software Computer Related Supplies |

PROJECT DIRECTOR:

George O'Neill
Savannah State College
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# PREPARING FOR HIGH TECHNOLOGY CAREERS IN COMPUTER INTEGRATED MANUFACTURING AND INFORMATION MANAGEMENT

TARGET AUDIENCE: Technical students in computer integrated manufacturing

AWARD: Grant G0083-02725 8/1/83 - 7/31/86 Cost: $300,000

Demand by employers for qualified technicians in Computer Integrated Manufacturing and Information Management far exceeds the supply. Engineering automation is being integrated into manufacturing at a rate of 30% annually. The greatest need is for the super technician who can install, operate, maintain, repair, and manage new systems. This project will identify automation skills required in automated manufacturing, electrical design and information management; to develop new and modify existing curriculum; develop new and modify existing curriculum, including software and courseware; update current industry and educational employees. The project will be evaluated and materials disseminated nationally.

MAJOR PRODUCTS: Simulation Software Course Designs and a Model of Collaboration with Industry.

PROJECT DIRECTOR:

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Milwaukee Technical College
Instructional Resource Coordinator
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# IMPROVING STUDENT'S ACADEMIC USE OF THE UNIVERSITY AS A TOTAL RESOURCE: AN EXPANDED ADVISEMENT PROGRAM USING INTERACTIVE COMPUTER TECHNOLOGY

TARGET AUDIENCE: College undergraduates and continuing education students

AWARD: Grant G0082-01389 9/01/1982-6/30/1984 Costs: $100,934

Innovative programs and flexible curricula options represent rich educational resources in many postsecondary institutions. Yet frequently students fail to take full advantage of such educational opportunities because of a lack of knowledge associated with poor academic advisement. At the University of Delaware, the College of Arts and Science established a College-wide Advisement Center. It is proposed to build upon and expand the work of this facility with a learner-centered advisement program designed to emphasize students' exploration of the rich educational diversity present in the College. Relying upon an existing computer-assisted instruction program (PLATO$^{R}$) and a network of over 175 graphics terminals already in place, five advisement modules will be designed: 1) Exploring Academic Options and Designing Individualized Programs; 2) Curriculum Requirements and General Academic Regulations; 3) Advisor-Advisee Message System; 4) Introductory Tutorial; and 5) Feedback and Evaluation.

It is anticipated that widespread use of this computer-based advisement system will result in improved use of academic program options, greater student satisfaction with their curriculum, improved advisor-advisee dialogue, and a means of maintaining a current and widely-accessible file of academic information. The University's substantial commitment to the establishment and continuation of the PLATO system and the commitment of the College of Arts and Science to advisement through establishment of the Advisement Center indicate the support which will continue to be provided for the computer-based component of academic advising. The conceptual design of the proposal and the approach taken to learner-centered advisement has potential for wider impact.

MAJOR PRODUCTS: Software that can be used on PLATO to serve as a computer based advisement system.

PROJECT DIRECTOR:

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Office of the Dean
College of Arts and Science
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# EMPLOYABILITY SKILLS TRAINING VIA COMPUTER ASSISTED INSTRUCTION

TARGET AUDIENCE: Adult Basic Education Students

AWARD: 7/01/1983 to 6/30/1984 Cost: $13,904.00

This project is designed to increase the employability skills of basic education students via computer assisted instruction.

MAJOR PRODUCTS: Project report

PROJECT DIRECTOR:

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160

## III. COMPUTERS FOR EDUCATORS

A. Helping Educators use Computers
   1. Educator Training
   2. Technical Assistance
   3. Developing Authoring Systems

B. Using Computers for Educational Management
   1. Computers for testing
   2. Instructional Management of Student Related Information
   3. Institutional Management
   4. District and State Level Decision Making

## DEMONSTRATION AND EVALUATION OF A COMPREHENSIVE PLAN FOR TEACHER EDUCATION IN FIVE EXTENSIVELY COMPUTERIZED SCHOOLS

TARGET AUDIENCE: Teachers in schools that are introducing Computer Based Instruction.

AWARD: Contract G00-83-03407 12/01/1983 to 11/30/1985
Cost: $149,416 (FY 84)

This project is to develop, test, and evaluate, teacher in-service materials that will enable teachers to make better use of modern computer technology in elementary school instruction. It is based on a 'levels-of-concern' model where a teacher moves from little knowledge, confidence, and experience to an array of actions and initiative based on considerable knowledge of (1) what the computer can and cannot do, (2) principles of learning, (3) knowledge of the curriculum, and (4) use of information about students available from the computer. As the teacher moves to the higher levels of concern, he/she will increasingly relate and integrate the computer based activities with more typical classroom activities. The computer system will be a 16/32 bit microcomputer with an 80 megabyte harddisk and 30 student terminals.

The project will proceed as follows: (1) a questionnaire will be developed to assess level of concern, (2) assessment of participating teachers' level of concern, (3) development of activities and lessons to promote higher levels of concern, (4) formative evaluation of the materials, (5) revision and implementation of the revised materials, (6) evaluation of the impact of the materials and the experience, and (7) second revision and dissemination of the materials assuming a positive evaluation.

MAJOR PRODUCT: On-line and print questionnaire to assess knowledge and level of concern of teachers. On-line print instructional materials for teachers. Textbook; evaluation report; professional papers

PROJECT DIRECTOR:

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# A DEMONSTRATION/TRAINING PROGRAM FOR MICRO-COMPUTERS

TARGET AUDIENCE: The teaching staff of the Montclair Township Schools, grades Pre-K-12.

AWARD: Grant #G00-83-03394 1/01/1984 to 1/01/1985 Cost: $80,080

The intent of this project is to provide in-depth computer literacy training for a core group of teachers who will, in turn, share their training with remaining staff, providing them with training to use a variety of computer applications to improve teaching methodologies and strategies which will enhance the communication between teacher and student. The training will be accomplished in an in-service program cooperatively developed with and provided by Bank Street College of Education, and will focus on three areas: training in the LOGO language, accessing information on computers, and understanding computer programming. A computer literacy curriculum guide will be developed and disseminated, reflecting the in-service program, and the teaching methodologies and strategies developed in the project. The project will also be shared through involvement in the Network for Action in Microcomputers (NAME), a computer consortium, and via telecommunications.

Apple II+ and IIe microcomputers are used to provide instruction for students in LOGO, accessing information on microcomputers, and programming.

This project is designed to be completed in two phases, the first concentrating on teacher in-service training for the core group of teachers and the completion of the curriculum guide, the second concentrating on the training of remaining staff, the establishment of demonstration sites, and the dissemination of the curriculum guide.

MAJOR PRODUCT: Teacher training curriculum guide

PROJECT DIRECTOR:

Dennis F. Lynch
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## ACADEMIC PROGRAM IMPROVEMENT VIA THE INCREASED USE OF COMPUTERS

TARGET AUDIENCE: Historically Black university's faculty and students

AWARD: G00-82-01481 10/01/1982 to 9/30/1985 Cost: $300,000

This activity is to provide on-line interactive computing for data storage, program compilation, and instruction. Benefits include greater student access to data processing and broader faculty involvement in implementing computer applications in courses.

During the first year, the activities focus on using a faculty member for each of three schools as a computer advisor for training and assisting their colleagues' initial efforts in CAI. Along with the existing programmer analyst, faculty will have peer-guidance in using computers for academic purposes. Also obtained in the first year will be a hardware expansion with microcomputers, and fifteen computer terminals will allow the faculty to select, test, document, and produce their own materials. Three courses are to be revised with CAI, as well as three computer application programs implemented.

The hardware proposed is to make the academic computer sufficient to meet student needs, with two new microcomputer laboratories and one on-line terminal laboratory with 20 machines added. Also, interfacing of four microcomputers with the current IBM 4331 mainframe computer is envisioned. Pre-programmed materials are included for student practice in problem solving. The final stage of hardware expansion is to provide microcomputers, on-line terminals, software, and access to computerized reference material for faculty research.

MAJOR PRODUCTS:

- Peer-assistance for faculty introduction to CAI
- Hardware for interactive on-line computing
- Access to software for research

PROJECT DIRECTOR:

Agenes Hassell
Virginia State University
P.O. Box T
Petersburg, Virginia 23803
(804) 520-6581

ED. DEPT. CONTACT PERSONS:

Donald H. Pretzer
Office of Postsecondary
Education
Division of Institutional
Development
Program Operations Branch
ROB 3, Room 3045
400 Maryland Avenue, S.W.
Washington, D.C. 20202
(202) 245-9091

## COMPUTER MANAGED COMPETENCY-BASED EDUCATION

TARGET AUDIENCE: Initially the activity will benefit the pre-service students in the Teacher Education Program and the faculties in the School of Education and the College of Arts and Sciences. However, when the activity is fully operational, all of the students in the School of Education and the College of Arts and Sciences will benefit (approximately 400). The students are predominantly Black (male and female), rural, and economically disadvantaged.

AWARD: G00-82-02169 10/01/1982 to 9/30/1987 Cost: $204,076

This activity is designed to upgrade the teacher education program to an effective computer-managed competency-based education instructional program. The activity will consist of the following: (1) assisting faculties in upgrading 80% of the courses and syllabi to reflect Alabama teacher certification objectives; (2) providing faculty with off-campus training programs in computer-managed teaching and learning programs; (3) developing computer-managed and competency-based education resource laboratory; and (4) contracting consultative services to provide on-campus staff development training in computer-managed technology for teaching. This is supported by Title III, Part B special needs program funds.

The following equipment will be used in developing the program:

(2) 64K microcomputer system (Apple IIe)
(2) Disk Drive
(2) Epson MX 80 Dot matrix printers
(4) Clustered terminal switch for micros
(1) Color monitor
(1) Letter quality printer
(1) Video recording unit

MAJOR PRODUCTS: Software (Teacher Education)

PROJECT DIRECTOR:

William Lester
Tuskegee Institute
Tuskegee, Alabama 36088
(205) 727-8011

ED. DEPT. CONTACT PERSONS:

Carl S. Person
Anne P. Collins
Office of Postsecondary Education
Division of Institutional Development
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Washington, D.C. 20202
(202) 472-5570

# COMPUTER TRAINING IN THE U.S. DEPARTMENT OF EDUCATION

TARGET AUDIENCE: Education Department personnel working with computers or in computer-related areas are eligible for the courses.

The Horace Mann Learning Center (HMLC) in the U.S. Department of Education offered eight computer training programs during 1983. The HMLC programs included courses and seminars covering introductory Automatic Data Processing (ADP) microcomputers, programming and management applications of computer technology. All of the courses and seminars were designed to enhance the use of computer technology in a wide range of department activities and functions. Specific courses include:

1. Making It Count: Introduction to Data Processing Concepts. The ten 1/2 day session course covers: fundamental computer concepts, batch processing, systems analyses, and multiprocessing and distributed data processing.
2. Introduction to Programming (BASIC). Topics to be covered in five 1/2 day sessions include: Programs--the mechanics of a single program, Loops--specifying large and repetitive operations, Data--processing large masses of information: Sequential storage, Decisions: making decisions based on data, Arrays: ordering data into list and tables.
3. Introduction to SAS (The Statistical Analysis System). This is a basic three-day course for data analysts who want to use SAS for data management, information retrieval, and report writing.
4. Microcomputer Literacy. Topics in this five 1/2 day session course include: introduction to microcomputer hardware and software, analyzing program options, selecting microcomputer systems, management and the microcomputer.
5. The Computer Programme. This five 1/2 day session explains microcomputer operation and the logic underlying BASIC programming.
6. Evaluating Technological Applications in Grant/Contract Proposals. This 1/2 day course provides information about hardware and software evaluation considerations and resources to assist program officers, managers or contract officers in evaluating proposals and monitoring projects involving applications of computers and telecommunications.
7. Design of Computerized Management Information Systems. This 5 day course focuses on the logical analysis and design of integrated information systems to assist managerial decisionmaking.
8. Technology Seminars. This 1/2 day session is a seminar to provide knowledge of advanced technologies.

PROJECT DIRECTOR:

Horace Mann Learning Center
Education Forum Branch
400 Maryland Avenue, S.W.
Washington, D.C. 20202
(202) 472-7793

ED. DEPT. CONTACT PERSON:

Horace Mann Learning Center
Education Forum Branch
400 Maryland Avenue, S.W.
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# NINE CREDIT PRE-SERVICE CERTIFICATE PROGRAM TO PREPARE SPECIAL EDUCATORS TO USE MICROCOMPUTERS

TARGET AUDIENCE: Pre-service Special Education Teachers

AWARD: Grant G00-83-02095 6/01/1983 to 5/31/1986 Cost: $184,692

The purpose of the project is to develop and implement the certificate program. The program will be a joint effort between the Capital Children's Museum and Trinity College. The instructional program consists of three courses:

1. Introduction to Applications of Microcomputers in Special Education Instructional Settings. The content of this course ranges from an orientation to microcomputers to elementary programming in BASIC and either PILOT or LOGO.
2. Instructional and IEP Systems Design and Implementation. The student will evaluate software, adapt existing software, and design classroom instructional units.
3. Computer-aided Instruction and Management. The students will design, program and test instructional units at a special education worksite.

The microcomputers used by the project include Apple IIe, Atari, and Texas Instruments.

MAJOR PRODUCTS: Curriculum for Certificate program.

PROJECT DIRECTOR:

Ann W. Lewin
Capital Children's Museum
800 3rd Street, N.E.
Washington, D.C. 20002
(202) 543-8600 Extension 238
(202) 543-8600 x238

ED. DEPT. CONTACT PERSON:

Anmarie Kallas Alleva
Office of Special Education and
Rehabilitative Services
Special Education Programs
400 Maryland Avenue, S.W.
Washington, D.C. 20202
(202) 732-1086

## FEASIBILITY STUDY ON THE DEVELOPMENT OF A COMPUTER-BASED COURSE FOR SPECIAL EDUCATION TEACHERS

TARGET AUDIENCE: Special education teachers.

AWARD: Contract 400-83-0036 10/1983 to 4/1984 Cost: $39,582

Simplifying and improving educational software creation is the goal of a three-phase project that has as its outcome a five- to ten-hour computer-based course that will teach special education teachers to design and develop instructionally sound courseware. Planning Systems International, Inc. (PSI) views this course as a front-end teaching tool to the authoring language that the U.S. Department of Education, Special Education Programs intends to fund through RFP 83-073. The course's intent is to increase the probability of teachers using that language to develop powerful courseware. Phase I of the project is to determine the course's feasibility by developing and field testing a one-hour lesson with a pre- and post-test designed to gather data on teachers' attitudes about computer-assisted instruction (CAI) and their abilities to develop CAI. If this component successfully changes attitudes and teaches CAI development principles, PSI proposes to finalize this one-hour lesson and develop an additional five- to ten-hours of instruction. The entire course will explain CAI terminology; introduce teachers to micros; discuss basic instructional formats; demonstrate how to write objectives that can be tested in CAI; discuss screen layout; and demonstrate the possible CAI formats the authoring language will allow.

MAJOR PRODUCTS: An authoring language for the development of special education CAI software.

PROJECT DIRECTOR:

Shelia S. Newman
Planning Systems International, Inc. (PSI)
200 Little Falls Street, Suite 104
Falls Church, Virginia 22046
(703) 534-7591

ED. DEPT. CONTACT PERSON:

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Office of Special Education and Rehabilitative Services
Special Education Programs
Switzer Building, Room 3613
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Washington, D.C. 20202
(202) 732-1125

# INTRODUCTION AND UTILIZATION OF CAI AND RELATED TECHNOLOGICAL DEVELOPMENTS IN THE PROVISION OF INSTRUCTION TO HANDICAPPED PUPILS

TARGET AUDIENCE: Special education administrators in local education agencies and state operated programs in the State of South Carolina.

AWARD: Grant G00-83-00917 6/01/1983 to 5/31/1986 Cost: $270,000

Special Education administrators will be trained so that they can develop implementation plans for CAI and related technological developments in their districts and replicate the training with their special education teachers. A series of sequential training sessions will be presented throughout the State for these administrators. The content will be:

1. Capabilities of CAI as it relates to instructional service delivery for handicapped pupils.
2. Basic functions of microcomputers.
3. Evaluation of appropriate hardware and software utilization in programs for the handicapped.
4. Capabilities of electric communication as it relates to special education.

The content emphasizes both administrators and instructional uses of microcomputers. The project will develop a trainers' manual and supplementary materials and will provide assistance as the training sessions are replicated.

MAJOR PRODUCTS: Trainers' manual for special education administrators in South Carolina.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Robert S. Black<br>Office of Programs for the Handicapped<br>South Carolina Department of Education<br>1429 Senate Street<br>Columbia, South Carolina 29201<br>(803) 758-7432 | Max Mueller<br>Office of Special Education and Rehabilitative Services<br>Special Education Programs<br>Division of Personnel Preparation<br>400 Maryland Avenue, S.W.<br>Washington, D.C. 20202<br>(202) 732-1068 |

# LEADERSHIP TRAINING FOR ADMINISTRATORS OF SPECIAL EDUCATION IN EMERGING TECHNOLOGY

TARGET AUDIENCE: Special Education Administrators in the State of California.

AWARD: Grant G00-83-00918 6/1/1983 to 5/31/1986 Cost: $195,000

The purpose of this project is to facilitate the applications of emerging computer technology in Special Education program administration in California. The project will develop five inservice training modules. The project will train Special Education administrators, and train trainers from the Teacher Education Computer Centers (TECC) and the Special Education Resource Networks (SERN). These later groups provide additional training and consultation to the target audience in the development of computer software.

MAJOR PRODUCTS: Five inservice training modules and publications. The critical Consumer and User's Guide review emerging technology and its potential application for special education program administration.

PROJECT DIRECTOR:

Karl E. Murray
Office of Special Education
California Department of
Education
721 Capitol Mall, Sixth Floor
Sacramento, California 95814
(916) 323-4783

ED. DEPT. CONTACT PERSON:

Victoria Ware
Office of Special Education and
Rehabilitative Services
Special Education Programs
Division of Personnel Preparation
400 Maryland Avenue, S.W.
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(202) 732-1087

## MOVING AHEAD: TRAINING RESOURCE PERSONNEL IN THE APPLICATION OF EDUCATIONAL TECHNOLOGY IN PROGRAMS FOR HANDICAPPED STUDENTS

| | |
|---|---|
| TARGET AUDIENCE: | Special education administrators and support personnel who will in turn act as instructional leaders and trainers. |

AWARD: Grant G000-83-00644 6/01/1983 to 5/31/1986
Cost: $242,091

The purpose of this project is to train resource personnel from the D.C. Public Schools to act as instructional leaders and trainers in the development, adaptation and utilization of instructional curricula and materials. Sixteen one day sessions are offered covering the following content areas:

- Principles of curriculum development;
- Evaluating and adapting instructional media and materials for use with handicapped students;
- Writing programmed instruction modules for traditional and programmable media;
- Classroom uses of interactive cable television;
- Videodisc and videotape utilization with handicapped students;
- Principles of computer programming;
- Use of computer authorizing languages;
- Computer assisted devices such as versabraille, voice synthesizers, etc.

MAJOR PRODUCTS: Training curriculum and supplementary materials.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Maureen Thomas<br>District of Columbia Public Schools<br>Division of Special Education and Pupil Personnel Service<br>Webster Administration Building<br>10th & H Streets, N.W.<br>Washington, D.C. 20202<br>(202) 724-4018 | Anmarie Kallas Alleva<br>Office of Special Education and Rehabilitative Services<br>Special Education Programs<br>Division of Personnel Preparation<br>400 Maryland Avenue, S.W.<br>Washington, D.C. 20202<br>(202) 732-1086 |

# MICROCOMPUTER APPLICATIONS IN SPECIAL EDUCATION

TARGET AUDIENCE: Special Education teacher educators (University faculty) and administrators.

AWARD: Grant G00-83-01646 7/01/1983 to 5/31/1986 Cost: $210,000

The project will synthesize existing Special Education microcomputer training materials and produce a training manual and training curriculum consisting of six modules. The products will be field tested in a series of workshops and in conjunction with a University in a computer camp setting. The curriculum is organized in six modules:

1. Microcomputer in Special Education--Selection and Decision making process, which is an introductory module based on an existing text;
2. Software and Hardware Evaluation, which is an extension of existing Special Education and non-Special Education work;
3. Adapting Special Education Curriculum Materials for use on Microcomputers, it includes previously developed methods, as well as a software package to assist in the modification of curriculum;
4. Computer Operations and Special Education Utilization, the emphasis of this module will be on Special Education applications in instruction, instruction-related and management situations;
5. Utilizing Peripherals for Special Education, this module reviews peripherals available and how they can be utilized with different handicapping conditions, and students with specific modality or learning problems;
6. Microcomputer programming for Instructional and Management Purposes, this module reviews existing Special Education Software, and uses the examples as a basis for future software development by the trainee.

It is intended that the target audience, University faculty and school district administrators, will later use the materials developed by the project for training University students and Special Education Teachers.

MAJOR PRODUCTS: The training manual and the six curriculum modules will be available through the Council of Exceptional Children.

| PROJECT DIRECTORS: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Josephine Barresi<br>The Council for Exceptional Children<br>1920 Association Drive<br>Reston, Virginia 22091<br>(703) 620-3660 | James Siantz<br>Division of Personnel Preparation<br>Special Education Programs<br>400 Maryland Avenue, S.W.<br>Washington, D.C. 20202<br>(202) 732-1072 |

## LEADERSHIP TRAINING IN COMPUTER TECHNOLOGY

TARGET AUDIENCE: University faculty in special education and speech-language pathology and audiology programs.

AWARD: Grant #G00-83-01083 6/01/1983 to 5/31/1986 Cost: $148,000

A five day workshop will be developed and tested for university faculty emphasizing applications of the microcomputer in the delivery of special education services to communicatively handicapped children and youth. The workshop will address the following topics:

1. Diagnostic Applications in Speech and Language Learning Disorders;
2. Diagnostic Applications in Hearing Disorders;
3. Education Management Systems;
4. CAI Coursework: Material Development and Use;
5. Development and use of Augmentative Devices;
6. Data Processing/Record Keeping;
7. Development of Applications for the Language Delayed child; and
8. Electrophysiological Measurements.

The workshop will be offered with continuing education credit, and will be the basis for additional training activities conducted by the organization.

MAJOR PRODUCTS: Workshop manual and workshop program videotapes, as well as other supplementary materials will be available through the organization for participants and other interested users.

PROJECT DIRECTOR:

James P. Gelatt
American Speech-Language-
Hearing Association
10801 Rockville Pike
Rockville, Maryland 20852
(301) 897-5700

ED. DEPT. CONTACT PERSON:

Doris Sutherland
Office of Special Education and
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Special Education Programs
400 Maryland Avenue, S.W.
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(202) 732-1074

## SCHOOL NURSE ACHIEVEMENT PROGRAM II:
## CURRICULUM ADAPTATION FOR EXPANDED AND ACCELERATED DISSEMINATION

TARGET AUDIENCE: School nurses who assist handicapped children in regular public school buildings.

AWARD: Grant #G00-83-02509 6/01/1983 to 5/31/1986 Cost: $347,040

Special health needs of handicapped children who receive their education in regular public school buildings are supervised by the nation's 30,000 school nurses. The School Nurse Achievement Program (SNAP) is an on-going national inservice training course, developed at the University of Colorado for school nurses, which has been highly effective in increasing and improving school health services for handicapped children. This present project aims to improve the method of delivery and distribution of SNAP, to meet the national demand of a large and diverse population of school nurses.

This project will improve and accelerate the dissemination of SNAP by adapting selected units of the curriculum for instruction via microcomputers and videodisc players in the school nurse's home school. The project's major outcomes will be: 1) development and demonstration of an interactive computer-assisted SNAP curriculum component which adds remedial and enhancement content to the course, standardizes the quality of instruction, and further decentralizes the delivery of the course; 2) development of nursing procedure demonstrations on videodiscs with interactive microcomputer capabilities; 3) demonstration and evaluation, including comparison of cost and school nurse learning achievement of this improved delivery system, for application to inservice programs for other professionals in the public schools; and 4) national professional and community two-way communication of needs pertaining to handicapped children's health in school and of benefits of the improved SNAP delivery system by the National Advisory Council for the School Nurse Achievement Program.

MAJOR PRODUCT: This year, 13 one-hour lessons are being prepared with accompanying manuals for Apple microcomputer disks on disability areas and related topics. Next year, the project will develop 28 minute interactive videotapes of nursing skills to assist school nurses, teachers, and parents of handicapped children.

PROJECT DIRECTOR:

Ann Smith
University of Colorado Health
Sciences Center
School of Nursing
4200 E. Ninth Avenue
Box C-287
Denver, Colorado 80262
(303) 394-8733

ED. DEPT. CONTACT PERSON:

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Office of Special Education and
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## HIGH TECHNOLOGY AS A MEANS OF MEETING COMMUNITY ADULT BASIC EDUCATION NEEDS IN A TIME OF CUTBACKS

TARGET AUDIENCE: Program staff, primarily minorities and women.

AWARD: TEC-13 7/01/1982 to 6/30/1983 COST: $4,997

The Center for Literacy, Inc. proposes to upgrade staff skills in the use of computer technology. The project will consist of the design and implementation of training for community-based literacy staff members in the use of a computerized information system. The training will focus primarily on the needs of minorities and women, since they compose the majority of workers and volunteers in community based organizations. This project is designed to enable the Center for Literacy, Inc. staff to deliver ABE services of higher quality to more students and tutors at no increase in cost.

PROJECT DIRECTOR:

John C. Cole, Jr.
Director
The Center for Literacy, Inc.
3723 Chestnut Street
Philadelphia, Pennsylvania 19104
(215) 382-3700

ED. DEPT. CONTACT PERSON:

Jim Parker
Office of Adult and
Vocational Education
Division of Adult Education
Services
ROB 3, Room 5624
400 Maryland Avenue, S.W.
Washington, D.C. 20202
(202) 245-0636

# LOCALLY DEVELOPED C.A.I. IN ADULT EDUCATION FOR JEFFERSON DAVIS PARISH

TARGET AUDIENCE: Adult Basic Education (ABE), GED students.

AWARD: 11/01/1983 to 4/30/1984 Cost: $44,812

The project objective is to involve employed adult education teachers in developing a computer assisted instructional system to aid in meeting the instructional needs of adult education students.

This project will develop a computer-assisted instructional system for a local adult education program. Activities will include obtaining knowledge through the application level of a selected microcomputer system, the review, editing and programming of previously developed skill exercises and training in the physical operation of the microcomputer system.

Evaluation will include review of the stated objectives of the project.

MAJOR PRODUCTS: Over 400 instructional exercises. Final project report.

PROJECT DIRECTOR:

W.H. Whitford
Jefferson Davis School Board
P.O. Box 640
Jennings, Louisiana 71209
(318) 824-1834

ED. DEPT. CONTACT PERSON:

Jim Parker
Office of Adult and Vocational Education
Division of Adult Education Services
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(202) 245-0636

# DEVELOPING COMPUTERING LITERACY SKILLS FOR ADULT BASIC EDUCATION TEACHERS

TARGET AUDIENCE: Teachers of adult basic education.

AWARD: 7/01/1982 to 6/30/1983 Cost: $50,963.50

Project objectives are:

- to increase the computer literacy level and instructional ability of the adult education teacher.
- to establish a computer software library for dissemination of learning programs.

Adult education teachers will:

1) improve their ability to teach the ABE/GED student through the use of individualized, computer-assisted instruction.
2) increase his/her awareness of the availability and appropriateness of commercially developed computer software which can be used in instruction of ABE/GED classes, and
3) be able to analyze their educational needs and goals and to select computer hardware/software to meet these needs and goals.

A final external evaluation will be conducted at the end of the workshop. It will be based on the formal evaluations completed daily by each participant.

MAJOR PRODUCT: Results conerning the workshop will be reported to appropriate State Department of Education personnel and to Adult Education Learning Centers.

PROJECT DIRECTOR:

Norman T. Guffy
Southwestern Oklahoma State University
Weatherford, Oklahoma 73096
(405) 772-6611

ED. DEPT. CONTACT PERSON:

Jim Parker
Office of Adult and Vocational Education
Division of Adult Education Services
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(202) 245-0636

## TEACHER TRAINING IN USING MICROCOMPUTERS

TARGET AUDIENCE: Teachers of adults.

AWARD: 7/01/1983 to 6/30/1984 Cost: $44,928

The project will conduct a five-day workshop for 40 adult educators with focus on:

- Providing information on the various types of minicomputers and software.
- Providing orientation in using microcomputers with undereducated and mentally retarded adults.
- Disseminating the results of research projects conducted by the San Antonio State School and State Hospital.
- Providing training in the use of software developed by the San Antonio State School and State Hospital in teaching basic skills to adults.

The project will also provide on-site technical assistance and training to adult educators and develop additional software programs for teaching basic skills.

A combination didactic/practical exercise/demonstration will be used for the workshop. Simplified BASIC programming instruction will be coupled with hands-on opportunities to dispel any fears that the adult basic education teacher may have that "using a computer is beyond them."

Appropriateness of the workshop, its presenters and their performance, and the computer assisted instruction software will be assessed using the standard teacher training session assessment instrument and a pre and post test of specific competencies covered. The effectiveness of the consultative assistance provided local cooperatives will be analyzed by tabulating the number of consultations provide at the local level, costs incurred and benefit gained, and by using a rating scale.

MAJOR PRODUCTS: An evaluation of the workshop by participants.
A final report
Software programs

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| David F. Culcasure<br>Director, Educational Services<br>San Antonio State Hospital and State School<br>P.O. Box 23310<br>San Antonio, Texas 78223<br>(512) 532-8811 X1346 | Jim Parker<br>Office of Adult and Vocational Education<br>Division of Adult Education Services<br>ROB 3, Room 5624<br>Washington, D.C. 20202<br>(202) 245-0636 |

## TEACHER TRAINING IN USING MICROCOMPUTERS

TARGET AUDIENCE: Adult basic educators.

AWARD: TEC-18 7/01/1982 to 8/31/1983 Cost: $19,991

This training program will develop adult basic education teacher's competence in implementing a computer assisted instruction program. The following will be covered: selecting and maintaining minicomputer hardware and peripherals; tips on purchasing "already programmed" software; "hand-on" examination of various "off-the-shelf" program items suitable for adult basic education applications; becoming aware of how the minicomputer can also be used to create, store, administer and score objective tests and monitor student progress, and acquainting the participants with the "basics" of the BASIC computer language, demonstrating how teachers--with no previous programming experience--can create subject matter software which incorporates branching techniques, student management and information routines, and various records-keeping functions.

A combination didactic/practical exercise/demonstration will be used for the workshop. Simplified BASIC programming instruction will be coupled with ample hands-on opportunities to dispel any fears that the adult basic education teacher may have that "using a computer is beyond them." This program will be evaluated.

MAJOR PRODUCTS: A comprehensive reference manual for adult basic educators participating in the workshop to assist them in setting up computer assisted instruction programs at their locations, to include information dealing with a screen-oriented authoring system that will allow teachers with no previous computer experience to create branching CAI materials. A comprehensive reference "catalog" listing already prepared CAI software programs having relevance to the adult basic education process. This will include such information as source, cost, course, description, machine compatibility and other relevant information.

The instructional manual and catalog referenced earlier in this report will be made available on a cost of reproduction basis by the

San Antonio State Hospital
6711 S. New Braunfels
San Antonio, Texas 78223

PROJECT DIRECTOR:

David F. Culclasure
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San Antonio State Hospital
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ED CONTACT PERSON:

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## THE NATIONAL ASSISTANCE PROJECT FOR SPECIAL EDUCATION TECHNOLOGY (NAP-SEP) (TECHNICAL ASSISTANCE TO LEA'S TO ADOPT AND IMPLEMENT TECHNOLOGY ADVANCES IN SPECIAL EDUCATION)

TARGET AUDIENCE: Local school administrators

AWARD: #300-83-0258 10/01/1983 to 9/30/1984 Cost: $302,407

This project will be a complete system of technical assistance to provide the information and technical support needed to assist local districts in implementing their plans for the use of technology in the education of handicapped children. The Network, Inc. and its subcontractor, Educational Products Information Exchange (EPIE) Institute, will set up an ongoing system to demonstrate technology applications including the use and application of microcomputers in the classroom, which can be used to give local school administrators, instructional personnel and members of the community an opportunity to see specific technologies at work, and to see alternatives available before making decisions on the applications of technology in their own districts.

It is expected that as an outcome of this project, administrators, instructional personnel and community members in selected LEA's will gain the knowledge and confidence to incorporate the use of technology into the educational program being provided handicapped children.

MAJOR PRODUCTS: Information services, planning guides, training model, case studies.

PROJECT DIRECTOR:

David Max McConkey
The Network, Inc.
290 South Main Street
Andover, Massachusetts 01810
(617) 470-1080

ED. DEPT. CONTACT PERSON:

Jane Hauser
Office of Special Education and
Rehabilitative Services
Special Education Programs
400 Maryland Avenue, S.W.
Washington, D.C. 20202
(202) 732-1126

## URBAN SUPERINTENDENTS NETWORK TECHNOLOGY STUDY GROUP

TARGET AUDIENCE: Technology staff and district administrators of the twenty-two urban school districts which belong to the Network

AWARD: Support through ad hoc conference contracts from NIE

The project brings together the staff members responsible for implementation of technology in the school districts which participate in NIE's Urban Superintendents Network to consider issues and concerns of common interest. When the Study Group was established in 1981, six districts were represented; now ten participate and others would like to be included.

At its inception, the Study Group sought to determine the extent of common interest and the feasibility of joint approaches to significant issues. Acquisition of effective computer hardware and courseware were identified as immediate concerns. The Study Group convened a meeting of Network districts with major vendors as a means of identifying the scope of concern. Subsequently, two activities were begun: (1) Training was provided to district representatives in assessing both hardware and courseware for potential acquisition. (2) A process for sharing the results of local assessments was developed which will ultimately result in local reports being entered into the dissemination system of the Education Products Information Exchange.

Currently the Study Group is exploring ways to implement the recommendations of the National Commission on Excellence in Education through the technology programs of local districts.

MAJOR PRODUCTS: Assessment reports as entered into Education Products Information Exchange system, (EPIE, P.O. Box 839, Watermill, New York 11976), Reading List on Courseware Evaluation/EPIE Institute Project, and reports on Study Group meetings available from project director or NIE contact.

PROJECT DIRECTOR:

John Grate
Study Group Chair
Chief, Research and Evaluation
Cincinnati Public Schools
Cincinnati, Ohio 45202
(513) 369-4870

ED. DEPT. CONTACT PERSON:

Charles Haughey
National Institute of Education
Program on Dissemination and
Improvement of Practice
1200 19th Street, N.W.
Washington, D.C. 20208
(202) 254-5654

## BEST (BASIC EDUCATION SKILLS THROUGH TECHNOLOGY)

TARGET AUDIENCE: State and local education agencies and educational administrators

AWARD: Contract 300-81-0421 10/19/1981 to 9/30/1983 Cost: $1,189,665

Project BEST was developed to provide technical assistance to State and local education agencies as they established technology programs for basic skills in school systems. The contract was awarded to the Association for Educational Communications and Technology and was designed to utilize a broad range of technologies to distribute information on practical technology applications, associated teacher training, microcomputer issues, the uses of various communications technologies, and other matters of interest to agencies organizing instructional technology programs. An early indication of broad appeal was evidenced when 41 State agencies indicated a strong desire and readiness to participate in the project, which had been designed for 20 States.

BEST used a range of technologies to deliver information and to illustrate potential uses of technology for basic skills and other education. These included satellite and telephone teleconferencing using video and audio techniques and an electronic mail network using microcomputers. Print information furnished States with case studies of microcomputers projects, guides for planning and implementation of technology programs, and supplementary material for four video modules to be used for training purposes. The project was most successful in assisting newly interested States in organizing their resources for a coordinated approach to the use of technology for instruction.

MAJOR PRODUCTS: Videotapes of five national satellite-delivered teleconferences on technology practices and issues for education. Five audio teleconference tapes sharing current and potential educational technology applications. Four videotaped information/training modules featuring current practice and experience with technology at the school level. BEST NET, a prototype electronic mail network featuring information-sharing and serving as a resource for locating materials and people to assist in technology problem-solving. Print materials to support planning and training for technology.

PROJECT DIRECTOR:

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## CENTER TO INCREASE STATE CAPACITY RELATED TO TECHNOLOGY APPLICATIONS IN SPECIAL EDUCATION

TARGET AUDIENCE: State and Local Education Agencies, university and other school personnel, and the Model Secondary School for the Deaf.

AWARD: #300-83-0282 10/01/1983 to 9/30/1984 Cost: $264,062

This Center will plan and conduct a series of meetings and symposia that will assist States to increase their capacity for implementing technology applications in special education. This technology may include microcomputers and computer assisted instruction as well as other technological innovations such as TV, speech and hearing aids. Computer experiences may include the use of technology in hands-on training demonstrations such as the use of telecommunication microcomputer hook-ups for on-site consensus building, and evaluations by participant response. Attention may also be given to combinations of computer and video technology especially the video disk which shows great promise for hearing impaired persons.

Center assistance to State education agencies will be coordinated with the Regional Resource Centers as they work with States in their regions to identify technology needs. The contractor will assist the Model Secondary School for the Deaf in the adaptation and use of current hardware and software applications.

MAJOR PRODUCTS: Meetings, evaluations and proceedings from each symposia.

PROJECT DIRECTORS:

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# NATIONAL TECHNOLOGY LEADERSHIP PROJECT (CAPS)

TARGET AUDIENCE: The project plans to enhance communication and information sharing among schools, LEAs, and SEAs regarding the advancements in technology and training required to integrate them into the classroom

AWARD: Grant G-83-0070 9/30/83 to 9/30/84 CCST: $145,000

Computer technology proliferation is challenging education to narrow the gap between students' growing awareness of technology and the lack of sophisticated learning technologies in the classroom.

This project will provide for communication and information sharing among schools, LEAs, SEAs and the federal government regarding advancements in technology and the training required to integrate them with classroom technique.

The project will provide a forum and a mechanism to develop a national agenda for implementing learning technologies in the schools. It will provide an electronic clearinghouse for SEA/LEA project activities through established networks, stimulate work on issues affecting applications of technology to education, and assist SEAs and LEAs in furthering communications. The project will increase the availability of learning technologies and expand awareness in teachers regarding daily applications. Technology practitioners in many levels of education will become more visible and important.

Project results will include establishing procedures, clarifying issues, and planning and evaluating activities; improving technical assistance and resources to local school districts; regional meetings; pilot programs; the first National Conference on Technology and State Departments of Education; creating and maintaining a resource data base; and establishing the project as a board resource for state departments of education in assisting local school districts.

MAJOR PRODUCTS: The final report will document the operations, results and effectiveness of the project, as well as describe how the project has been institutionalized.

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## EDUTECH (TECHNICAL ASSISTANCE TO SEA'S AND LEA'S IN THE USE OF APPROPRIATE TECHNOLOGICAL ALTERNATIVES IN SPECIAL EDUCATION SERVICE DELIVERY)

TARGET AUDIENCE: Regular and special education educators in local and State Education Agencies and parents.

AWARD: #300-81-0424 10/01/1983 to 9/30/1984 Cost: $684,743

This three-year technical assistance project explores issues in special education and disseminates information to SEA's and LEA's in the form of fact sheets, resource guides, reports, journal articles, and audio-visuals about technological solutions to these issues. It has also established and maintains an information system for educators and others interested in current technological developments such as using micro computers with handicapped students and in applications of these developments in special education.

MAJOR PRODUCTS:

Fact Sheet: Microcomputers Computer Managed Instruction

Resource Guide: Software

Resource Guide: Research on Educational Use of Computers

Annotated Bibliographies: Microcomputer Technology in Education; Selection of Microcomputers; Computer Literacy;

Bibliography: CAI: Reading, Writing and Communication

PROJECT DIRECTOR:

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## REGIONAL EXCHANGE

TARGET AUDIENCE: State education agency staff with responsibility to plan and implement programs supporting local educators' use of educational technology.

AWARD: Contract 400-83-0006 12-01-82 to 11-30-84 Cost: $25,000 (Part of Larger Contract)

The overall Exchange project provides R&D-based information, training, and technical assistance in support of dissemination and school improvement programs designed and implemented by the States of Delaware, Maryland, New Jersey, and Pennsylvania.

This part of the larger project is designed to help four States which are in various stages of planning and implementing activities to support local use of microcomputers. The State activities include conferences and workshops on the topic, software fairs, development of State files of software reviews and evaluations, development of formal State policies and program plans in support of local use of microcomputers. In support of these activities, Research for Better Schools is:

- providing information about alternative approaches States have been taking to support local use of microcomputers;
- assisting in the development of resouce materials around the use of microcomputers in specific subject matter areas;
- analyzing a sample of school district plans in order to identify possible assistance they may need from the States;
- sponsoring four-State meetings to facilitate the exchange of information and ideas.

MAJOR PRODUCTS: (none at this time)

PROJECT DIRECTOR:

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# SOUTHWEST EDUCATIONAL DEVELOPMENT LABORATORY'S REGIONAL EXCHANGE (SEDL/RX)

TARGET AUDIENCE: SEA's and other educators in the SEDL region: Arkansas, Louisiana, Mississippi, New Mexico, Oklahoma, Texas

AWARD: Contract Grant 400-83-0007, 12/1983-12/1984 Cost: $260,000

This project disseminates outcomes of research and development to six State departments of education, and provides client-responsive general technical assistance in both the process of dissemination and the contents of specific areas. Eighty percent of project activity currently focuses on educational technology, particularly microcomputer hardware--and software--related issues: syntheses, application modules, reports on new technology. The project also assists in maintaining a Technology Demonstration Center.

MAJOR PRODUCTS: R&D Speaks on Microcomputers in Education (Proceedings, 1981);

R&D Speaks on Evaluation of Educational Software (Proceedings, 1983);

R&D Speaks on Effectiveness of Microcomputers in Educational Applications (September, 1983, Proceedings);

Evaluation of Educational Software: A Guide to Guides (SEDL/NEREX, 1983);

Evaluation of Educational Software: Application Module (pilot);

Educational Technology Update (Bimonthly) ex: Managing Technology: Two State Education Agency Approaches; Electronic Information Services: Approaches to Information Networking; Computer Camps: Back to BASIC; Audio Teleconferencing.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
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## THE COOPERATIVE SCHOOL IMPROVEMENT PROGRAM

TARGET AUDIENCE: Elementary and secondary education community

AWARD: Indirect support by Educational Laboratories and Centers

This cooperative project among the NIE supported labs and centers was coordinated by the Council for Educational Development and Rearch (CEDAR) to identify emerging practices, products and publications from these organizations in the areas of effective schooling and educational technology. Three seminar workshops on computer technology and their application in school settings, a special technology issue of CEDAR. Comments and the Evaluator's Unauthorized Microcomputer Survival Manual resulted from this project.

The 58-page survival manual presents a non-technical view of microcomputers for educators who, with limited time, resources, and technological background must sift through a barrage of information to determine how, why, when, where, and even if, they will use microcomputers in schools and classrooms. Written in a light and often humorous vein, the manual tells just what microcomputers can and cannot do in instruction, classroom management, and administration. It also suggests how to tell good computer programs from the bad.

It is organized around three basic survival skills: knowing how, where, when, and why to use microcomputers; knowing the appropriate questions to ask about programs and equipment; and knowing some computer terminology.

MAJOR PRODUCTS: The Educator's Unauthorized Microcomputer Survival Manual $4.50 from CEDAR.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
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## SIMPLIFIED COURSEWARE AUTHORING SYSTEM WITH SIMULATION AND VIDEO/GRAPHIC CAPABILITIES

TARGET AUDIENCE: Educators and other developers of CAI software.

AWARD: #400-83-0033 Small Business Innovation Research Program
10/1983-4/1984 Cost: $36,300

Computer Assisted Instruction (CAI) has yet to keep its promise. It is frequently poorly conceived, inadequately developed, and often irrelevant to real educational needs. Worse, most courseware fails to utilize recent advances in computer simulation and modeling, and graphic technologies, and thus remains rooted in the past. Given their position on the front lines of education, teachers are an ideal source for good courseware, but current methods for creating instructional programs are complex, and their use requires much experience and training.

This project will develop an easy-to-use, automated courseware generator. This authoring system will allow educators to create effective instructional software without prior training or experience--literally, the first time they use it. The system will create source programs in a nearly universal operating system and language, and will run on extremely inexpensive microcomputers.

The original design is capable of true simulation of objects and ideas over a broad range of subject matter, effortless creation of graphics, and complete pictorial transformations.

MAJOR PRODUCTS: A low cost, easy-to-use authoring system for CAI instruction.

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# A NEW INSTRUCTIONAL TECHNOLOGY TO ENHANCE TRANSITION FROM SCHOOL AND COMMUNITY FOR MILDLY HANDICAPPED INDIVIDUALS

TARGET AUDIENCE: Developers of CAI for midly handicapped adolescents and young adults.

AWARD: Grant 9/15/1983 to 3/14/1984 Cost: $98,796

The purpose of this proposed research project is to demonstrate the utility of computer assisted video instruction for teaching mildly mentally handicapped adolescents and young adults important knowledge. The major product from this effort will be the CAVI User's Development Manual, which will present a step by step comprehensive model for producing quality courseware in these career education areas targeted to this population. The three interrelated components of the model will include the learning characteristics of this group, the important content areas for community transition, and the necessary technical aspects of computer program and video production. The project will serve as a pioneer step to provide the impetus for the creation of appropriate courseware for the secondary aged handicapped, and, hopefully, encourage and facilitate high quality development standards.

MAJOR PRODUCT: User's Development Manual

PROJECT DIRECTOR:

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## MICROCOMPUTER SOFTWARE FOR INDIVIDUALLY MANAGED INSTRUCTION

TARGET AUDIENCE: Teachers and administrators.

AWARD: #300-83-0278 10/01/1983 to 3/31/1985 Cost: $169,269

This project will develop an authoring system that will allow teachers with little or no computer programming skills to develop courseware for computer-assisted-instruction of handicapped students. The project will adapt and modify an existing authoring system (Torricelli). The couseware developed under this authoring system will be selec. ble in terms of readability level, and the teacher will be able to select input and output modes for the lesson. This feature will allow handicapped students with the same instructional content needs to use the same courseware with a variety of input and output devices. The system will be completely documented and field tested.

MAJOR PRODUCTS: A computer software authoring system for teachers of handicapped children.

PROJECT DIRECTOR:

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## MICROCOMPUTER SOFTWARE FOR INDIVIDUALLY MANAGED INSTRUCTION

TARGET AUDIENCE: Teachers and administrators

AWARD: #300-83-0271 10/01/1983 to 3/31/1985 Cost: $327,043

This project will develop a two-level authoring system for individually managed instruction of the handicapped. A prototype model of the authoring system will permit two levels of authoring activity. The first level of activity will involve the production of "Micro-units" of instructional content. The development of these micro-units would occur by development groups within a school district or by commercial publishers. The second level of authorizing would occur in the classroom by teachers. The second level of capability will allow the teacher to selectively combine micro-units to meet the needs of individual students. Micro-units will be authored to meet the instructional requirements for particular types of disability. A working model will be field tested to run on commercially available microcomputers.

MAJOR PRODUCTS: A computer software authoring system for teachers of handicapped children.

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|---|---|
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## MICROCOMPUTER SOFTWARE FOR INDIVIDUALLY MANAGED INSTRUCTION

TARGET AUDIENCE: Teachers and administrators.

AWARD: #300-83-6276 10/01/1983 to 3/31/1985 Cost: $244,080

This project will develop and evaluate an authoring system for teachers of handicapped children to use in producing individualized computer assisted instruction, applicable to a wide range of handicaps, and requiring no programming knowledge by the teacher or major new equipment by the schools. This approach utilizes the advanced microcomputer software development and system engineering skills of the Applied Physics Laboratory in combination with the Division of Education faculty's expertise in instructional programming of handicapped children. The conceptual framework is based on the progress made to date and problems encountered in developing authoring techniques, a basic understanding of the educational needs over the entire range of handicaps and a total system approach to the educational environment and to the design of a capable and easy to use authoring system. The authoring system will be field tested and project activities will be closely related to the Special Education Program's marketing program.

MAJOR PRODUCTS: A computer software authoring system for teachers of handicapped children.

PROJECT DIRECTOR:

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# DIAGNOSTIC TESTING PROJECT

TARGET AUDIENCE: Classroom teachers, test developers, District R&E offices, researchers.

AWARD: Grant NIE-G-83-01 12/01/1983 to 11/30/1985 Part of a larger award

The Diagnostic Testing Project is developing a micro-computer based tailored testing environment to assess students' strengths and weaknesses and to identify the specific sources of their errors and/or misunderstandings. The system is designed for testing individual students and uses branching options to efficiently diagnose their needs. The results provide teachers with detailed feedback on individual, group, and classroom performance so that appropriate remediations may be designed and implemented.

The diagnostic testing system is being developed to provide a flexible testing strategy that will be applicable across a range of subject areas. Illustrative tests have been developed in science and language arts and a diagnostic test of reading comprehension is being planned currently. When ready, this latter test will be tried out in classrooms to examine the effects of diagnostic testing on teachers, their instruction, and student performance. In addition to investigating the software and psychometric implications of computer-assisted diagnostic testing, the project also is studying optimal design strategies for developing diagnostic tests.

MAJOR PRODUCTS: The CSE Diagnostic Testing System, including software and documentation for implementing a computer-assisted diagnostic testing system.

Technical Reports on the psychometrics underlying diagnostic testing.

Technical Reports on design considerations for developing diagnostic tests.

Technical Reports on the effects of diagnostic testing in classrooms.

Illustrative Diagnostic Tests in reading and language arts.

PROJECT DIRECTOR:

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## MICROCOMPUTERS AND CLASSROOM TESTING

TARGET AUDIENCE: Classroom teachers at all grade levels

AWARD: Contract 400-82-0014 9/01/82 to 8/31/84 Cost: $71,423

Software and print materials are being developed to assist teachers in the development, evaluation and management of test materials. A comprehensive software package will be developed for the Apple microcomputer with one disk drive and 48K bytes memory. This package will consist of various independent modules, including modules for maintaining a teacher's grade book, calculating grades, maintaining a bank of test items, evaluating test items, scoring tests, and compiling tests. Print materials will include a primer on judging test items and materials on using the computer package. All materials are being developed in conjunction with classroom teachers. The materials will be extensively field tested in several schools and then revised.

MAJOR PRODUCTS:
- Software
- User's guide
- Primer on judging test item quality

PROJECT DIRECTORS:

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# PROJECT RECIPE
# (RESEARCH EXCHANGE FOR COMPUTERIZED INDIVIDUALIZED PROGRAMS OF EDUCATION)

TARGET AUDIENCE: Specific Learning Disabled students in grades K-6. Training designed for educators of this special population.

AWARD: Grant G008301159 11/1/83 to 10/31/87 Cost: $42,958 (first year)

Project RECIPE is a computerized instructional management system designed to assist special educators with the task of creating and implementing Individualized Educational Plans(IEPs). Microcomputers are employed as the vehicle for storing student demographic data, creating IEPs and implementation plans, tracking student progress, and generating IEPs and progress reports in compliance with federal guidelines.

The RECIPE system provides banks of instructional objectives in the basic skills areas of reading, writing, and mathematics as well as objectives in the areas of foundation, articulation, socialization, and motor skills which are organized into learning maps to provide the educator with an organizational pattern for planning instruction. These objectives are accompanied by two forms of a criterion-referenced assessment system and a listing of over 2400 instructional strategies correlated to each objective by number. Student Activity Books and Audio Tapes are available for 25 of the basic skill learning maps with which the target population displayed the most difficulty. Teacher Guides and Answer Books are provided for the Student Activity Books. Additional planning materials, Parent Guides, and a student rewards system are built into the RECIPE material package and delivery system process.

Approved by the Joint Dissemination Review Panel, Project RECIPE has received dissemination funds from the National Diffusion Network to make public and nonpublic schools, colleges and other institutions aware of what RECIPE offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation and follow-up services are available. Teachers interested in using RECIPE must undergo a two-day inservice training session which includes the use of the microcomputer management portion. Microcomputer software(including User Guide and Reproduction Agreement) is available for the Apple and the TRS-80 at a cost of $300 and $400 respectively.

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## DEMONSTRATION EVALUATION CENTER (CAM)

TARGET AUDIENCE: Teachers and administrators of students grades K-12.

AWARD: Grant G008202194 9/1/82 to 8/31/86 Cost: $63,496 (two years)

CAM is a microcomputer-based instructional management system using teacher-defined course mastery learning approaches.

The Evaluation Center has developed and operates a computer-based instructional management system that provides relevant data to teachers and students after each test on course objectives. Also available for inclusion in the print-out are data on classroom performance on each objective and a test form evaluation. This information is usually available 24 to 48 hours after a classroom has been CAM-tested.

Teachers using the CAM systems of monitoring student achievement first commit themselves to basing their instruction on course objectives developed by curriculum groups and teaching teams in the district. They also test the course objectives on a regular basis, every two to three weeks. The objectives are tested by teacher-developed test items, generally five to ten for each objective. Most teachers request tests that are pretest, posttest, and retention test in one.

The system is used in classrooms that are group-paced, individualized, multigraded, etc. Approximately 1,000 classrooms (grades 1-12) are using the system in subject areas including math, science, social studies, English, and reading. The Evaluation Center has developed techniques to assist teaching teams in identifying instructional strengths and weaknesses.

Approved by the Joint Dissemination Review Panel, CAM has received dissemination funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what CAM offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. Software costs between $150-300. Software has been written for both the Apple II micro-computer and mainframe.

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## COMPUTER ASSISTED DIAGNOSTIC PRESCRIPTIVE PROGRAM IN READING AND MATHEMATICS (CADPP)

TARGET AUDIENCE: Teachers and administrators of reading students in grades 3-9 and math students in grades 3-7.

AWARD: Grant G008001182 10/1/80 to 5/11/84 COST: $142,000 (Cumulative)

The Computer Assisted Diagnostic Prescriptive Program is a pull-out program utilizing resource labs and computer assistance to prepare remedial reading and remedial mathematics educational plans and weekly prescriptions. A locally developed battery of standardized criterion-reference tests is used for diagnosis and evaluation. The computer system prescribes learning activities based on individual achievement levels, learning modalities, and interests; channels students to the learning centers; tracks progress to ensure that prescriptions are not repeated; and maintains continuous progress reports for the students, teachers, and parents.

Approved by the Joint Dissemination Review Panel, CADPP has received dissemination funds from the National Diffusion Network to make public and non-public schools, colleges, and other institutions aware of what CADPP offers and to provide inservice training, follow-up assistance and program materials to schools and others that want to adopt the program.

MAJOR PRODUCTS: Awareness, implementation, and follow-up services are available. Software costs $500 and is available in two versions: batch COBOL and interactive BASIC. The COBOL program runs on Interdata Model 74, IBM, and NCR minicomputers and the interactive BASIC is written for the Apple II and the TRS-80 microcomputer.

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## MIGRANT STUDENT RECORD TRANSFER SYSTEM

TARGET AUDIENCE: Migrant children

AWARD: Contract 300-76-0090 10/01/1983 to 9/30/1984 Cost: $4.9 million

This system is a computerized educational and health system for migrant students in preschool through 12th grade. The system has approximately 200 telecommunication devices located in 44 States serving all 50 States, Puerto Rico, and the District of Columbia area. Terminals submit student data on migrant children on a daily basis. Curriculum being taught to migrant children is established by each State through application submitted to the U.S. Department of Education. The curriculum varies according to the established needs of migrant children at the various levels. Through the Migrant Student Record Transfer System teachers have at their disposal special programs, test, special interest, health, criterion, and skills data that enables them to place the child immediately. This allows teachers to formulate ideas on what the student has mastered and what program should be developed around each of the State programs. Presently the computer is programmed to provide all skill based information on all children in the areas of reading, math, oral language and early childhood skills. This information is part of the total history of every children in the development of his or her profile.

MAJOR PRODUCTS:

1. Skills in reading, math, early childhood and oral languages.
2. Credit exchange for secondary migrant students.
3. Student education and health data.
4. Management report for State Directors and the U.S. Department of Education.

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## USE OF MICRO-COMPUTER AS A DIAGNOSTIC AND TEACHING TOOL IN MATH AND ENGLISH

TARGET AUDIENCE: Older adults with eighth grade education or less, rural residents.

AWARD: TEC-16 10/01/1982 to 6/30/1983 COST: $15,000

This program will develop diagnostic material in math or English; use micro-computer to administer and score materials developed; develop a link between tests and material available; develop a link between test and software available; develop computer user skills by ABE students and teachers; and diagnose and prescribe materials to meet deficiencies in skill areas.

A meeting between ABE teachers and consultants was used to identify skills and levels to be covered by the project. The project team developed short diagnostic tests. This material was used by ABE students, and micro-computer printouts helped refine them. Reports and records will be kept to determine the acceptability of the diagnostic aspect of the program. Fifty hours of instruction will be evaluated.

MAJOR PRODUCTS: Diagnostic tests and an evaluation report.

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Division of Adult Education
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## THE EDUCATIONAL APPLICATIONS OF COMPUTER TECHNOLOGY

TARGET AUDIENCE: Rural residents with less than high school education.

AWARD: 10/01/1983 to 6/30/1984 Cost: $8,080

Project will train for awareness and use of computers with adults and the diagnostic testing of adults.

Project objectives are:

1. To increase Adult Basic Education (ABE) enrollment.
2. To decrease drop-outs.
3. To accelerate student achievement.
4. To develop a useful diagnostic and mastery test.

MAJOR PRODUCT: Computer diagnostic testing software for adults.

PROJECT DIRECTOR:

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## COMPUTER ASSISTED STUDENT DIAGNOSIS AND PROGRAMMING

TARGET AUDIENCE: Adult Basic Education (ABE) teachers and students.

AWARD: 7/01/1983 to 6/30/1984 Cost: $6,921

The objective is to conduct a computer diagnosis and to develop instructional programming.

Formative evaluation data will be collected and reported with each quarterly report. This data will be used to make in-progress project changes as necessary. A summative evaluation will be conducted during the last month of the project. This will be used to collect data that will provide evidence of accomplishment of the project objectives.

MAJOR PRODUCT: A micro-computer program that will assist teachers in ABE student assessment and instructional programming.

PROJECT DIRECTOR:

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# MICROCOMPUTER INSTRUCTION: DIAGNOSIS AND EVALUATION OF STUDENT SKILLS

|  |  |  |
|---|---|---|
| TARGET AUDIENCE: | Adult Basic Education, GED, and high school diploma students. | |
| AWARD: | 7/01/1983 to 6/30/1984 | Cost: $1,800 |

Specific objectives are:

- To provide computer-assisted instruction in the basic academic skills.
- To develop and refine basic skills diagnostic programs for adults.
- To refine CAI evaluation of student skills.

An Apple IIe will be placed in the main ABE classroom to provide direct instruction in routine skills, drill exercise and skill evalaution. The program director who is a specialist in adult basic skills diagnosis will develop and/or refine diagnostic programs so they are suitable for adults. Basic skills software recommended by the Region X Adult Education Software Consortium will be field tested. The effectiveness of the microcomputer in the diagnosis of adult basic skill deficiencies will be analyzed.

An evaluation will be requested from the Postsecondary Education Department, Oregon State University.

MAJOR PRODUCT: Project report

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Bonnie Orr<br>Director, Developmental Education<br>Central Oregon Community College<br>NW College Way<br>Bend, Oregon 97701<br>(503) 382-6112 | Jim Parker<br>Office of Adult and Vocational Education<br>Division of Adult Education Services<br>ROB 3, Room 5624<br>Washington, D.C. 20202<br>(202) 245-0636 |

# BASIC SKILLS

TARGET AUDIENCE: Teachers, principals, and central office staff of school districts involved in instructional improvement

AWARD: Contract 400-83-0006 12-01/82 to 11/30/84 Cost: (Part of Larger Contract)

This work is part of a larger program designed to help teachers, administrators, and supervisors in school districts work together to improve the levels of certain critical student classroom behaviors (student use of time, prior learning, content coverage, and academic performance). The purpose of this project is to explore the feasibility and effectiveness of using microcomputers to manage information about instruction and learning.

More specifically, Research for Better Schools (RBS) will exlore with principals and teachers the use of the microcomputer in supervisory conferences to identify opportunities for improving classroom learning behaviors and to match opportunities with research-based, improvement strategies.

Working with principals and teachers, RBS will also test use of the microcomputer to plan, manage, and monitor instructional content. Year-long instructional plans that attend to entering strengths and weaknesses of the lcass, align the curriculum with the content to be tested, and allocate time to each topic will be investigated.

Finally, RBS will explore use of the microcomputer to link and summarize instructional data across classrooms and schools to facilitate instructional monitoring and management by school district administrators.

MAJOR PRODUCTS: Project reports
Management software

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| David Helms<br>Research for Better Schools, Inc.<br>444 North Third Street<br>Philadelphia, Pennsylvania 19123<br>(215) 574-9300 | Michael Bruner<br>National Institute of Education<br>Program on Dissemination and Improvement of Practice<br>1200 19th Street, N.W.<br>Washington, D.C. 20208<br>(202) 254-5654 |

# PROJECT ACCESS

TARGET AUDIENCE: Adult education instructors

AWARD: TEC-7 7/01/1982 to 6/30/1983 COST: $88,605

Access is a comprehensive research and development project which provides a plan for integrating basic skills instruction and vocational information by means of computerized information systems.

Project Access will work with four adult education programs to develop a training package which will delineate the step by step process involved in analyzing the basic skills requirements of specific jobs and developing the related student Competency Assessment Tests; work with the four adult education programs to assist them in obtaining access to available computer information systems and to develop an Adult Education Computer Access Plan; develop a computer program which will be used to design Personalized Instructional Prescriptions for each student based upon his or her own goals and subsequent performance on the student selected competency tests; and develop a plan for a statewide computerized, adult education information system which will provide adult education programs with information concerning: labor statistics, vocational programs, career-oriented basic skills instructional materials, and basic skills breakdowns for specific jobs and specific vocational training courses.

MAJOR PRODUCTS: Computer program for Personalized Instructional Prescriptions.

PROJECT DIRECTOR:

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## MINI AND MICRO COMPUTERS AS AN ABE CLASSROOM TEACHER'S AID AND DATA CONTROL

TARGET AUDIENCE: ABE teachers

AWARD: TEC-9 10/1981 to 9/1982 Cost: $27,691

With the availability of the low cost computers, data management and teacher assistance with classroom materials can be more efficient and will maximize the learning experience for the ABE student.

Specifically, the objectives of the proposal are:

1. To continue refining software programs that have been developed or modified to more accurately collect, store, and retrieve data on ABE students.
2. To continue refining and providing software programs that have been developed or modified to give teacher more assistance in locating appropriate resources for ABE students, based on pre-test or placement test scores.
3. To continue refining software programs that store and retrieve progress records of students.
4. To continue refining existing programs and provide additional programs that will assist the ABE staff to more efficiently manage the administrative role in ABE.
5. To provide a software program that will calculate total student data from across the state program.
6. To continue meeting objectives of original proposal for 1981-82 year.

MAJOR PRODUCTS: Software programs for data management.

PROJECT DIRECTOR:

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# DEVELOPMENT AND DISSEMINATION OF MICROCOMPUTER CURRICULUM-MONITORING AND INSTRUCTION DECISION-MAKING PROGRAMS (MID-PROGRAMS)

TARGET AUDIENCE: Special education teachers

AWARD: Grant G00-83-01008 6/01/1983 to 5/31/1986
Cost: $222,000

The purpose of the project is to help special education teachers individualize their instruction by tracking each individual student's performance on a daily basis. The daily data are then used to make decisions about the student's progress and alter the instructional program as needed to insure that the student will be successful. The project will build on the Precision Teaching Model. The project will:

1. Develop curriculum-monitoring and instruction decision making programs (MID-Programs) in three academic areas: a) mathematics, b) reading, and c) language arts;
2. Validate the three MID-Programs;
3. Develop computer programs for the MID-Programs;
4. Develop exportable special education teacher training materials;
5. Train special education teachers; and
6. Evaluate the project.

Software development will be done in conjunction with Utah State University.

MAJOR PRODUCTS: Three MID-Programs, self instructional training materials and accompanying computer software.

PROJECT DIRECTOR:

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## EVALUATING AND PROVIDING FEEDBACK ON THE EFFECTIVENESS OF INSTRUCTION FOR HANDICAPPED CHILDREN INTEGRATED IN INNER CITY SECONDARY SCHOOLS

TARGET AUDIENCE: Special education, school administrators, researchers, psychologists.

AWARD: Contract NIE-G-80-0089 8/01/1980-7/31/1983 Cost $199,675

This project is designed to develop, implement and evaluate an efficient and systematic data management and information system to provide regular and resource teachers of inner-city, mainstreamed, mildly handicapped high school students with daily records of the appropriateness and effectiveness of instruction and the progress of the individual child in each subject area in both regular and resource classrooms. The project is also developing efficient methods of accumulating the individual student/individual teacher data and reporting these data for administrative decision making.

Information is being collected regarding teacher use of the microcomputer for assessing student performance and planning for remedial activities. The researchers are determining how often teachers access the student data base and how much time they spend using the microcomputer.

MAJOR PRODUCTS: Final report at end date.

PROJECT DIRECTOR:

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# MICROCOMPUTER-ASSISTED NEEDS ASSESSMENT SYSTEM FOR TEACHER TRAINING IN SPECIAL EDUCATION

TARGET AUDIENCE: Special education university faculty who will use the software with university students.

AWARD: Grant G00-83-02314 8/01/1983 to 5/31/1986 cost: $285,000

The purpose of the project is to develop, test and disseminate a microcomputer approach in needs assessment in teacher training for special education. The project will develop a microcomputer system using the "rule-based expert system" methodology. The methodology consists of programming principles drawn from the field of artificial intelligence. Decision rules developed on the basis of experts become part of the software to guide the trainee through a selective process of needs assessment. The software presents recommendations as to specific training experiences of greatest benefit to the trainee. The project plans to use the AL/X computer program developed by Intelligent Terminals Limited, and will use IBM Personal Computers with 256K RAM or an equivalent configuration. Field testing will be conducted primarily at the University of Maryland.

MAJOR PRODUCTS: Needs Assessment Software and Documentation.

PROJECT DIRECTOR:

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## COMPUTER SCIENCE-COMPUTER SYSTEMS IMPROVEMENT PROGRAM

TARGET AUDIENCE: Approximately 1,182 college students

AWARD: G00-82-02565 10/1983 to 9/1984 Cost: $343,078

The present computer system utilized at Bishop College is an IBM System 34 which can only accomodate sixteen computer stations (terminals) with a minimum amount of memory (265K).

The System has the following capabilities:

1. Maintains computerized records and generates appropriate reports for an Accounts Receivable System;
2. Maintains computerized records and produces appropriate reports for an Accounts Payable System;
3. Maintains a computerized Payroll System; and
4. Maintains a computerized General Ledger and produces appropriate management reports, including a balance sheet and fund analyses statements.

Title III, Part A grants funds have enabled the institution to improve its fiscal managment to such an extent that it has received certified audits for the last two fiscal years. Even though the above system is technically operable, it is not interactive with the other sub-systems such as Admissions, the Registration process, and Financial Aid. The Program has State accreditation.

MAJOR PRODUCTS:

- Develop a set of standard operating procedures and user forms.
- Develop a computerized check-out system for the library.
- Develop an inventory system for all supplies.
- Develop an on-line admissions system.
- Develop an alumni/development system for maintenance of alumni/development files.
- Develop a financial aid system which will maintain financial aid data.

PROJECT DIRECTOR:

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## MAKING THE WORKPLACE BETTER

TARGET AUDIENCE: Education Department personnel in clerical, technical and professional level positions.

The Department of Education has undertaken several initiatives involving the acquisition, installation and operation of technology to enhance the productivity of Education Department staff. During 1983 the initiatives involved the following:

- Electronic Mail

  The Department has installed DIALCOM's system of computer-based message services which allows the Department to move information without paper. There are several technological advances planned or currently under development for the system which will enable nonlike word processors to communicate; create a document distribution system (EPUB) and establish a computer conferencing system (PARTICIPATE).

- Office Automation

  Compucorp installed 300 microcomputer workstations which are providing desk top computing capabilities. Capabilities include word processing for clerical staff and data base management and spread sheet software for professional staff.

- Personal Computers

  The Information Resources Management Service (IRMS) is establishing Department-wide procurement specifications for the acquisition and operation of personal computers. The specifications are designed to assure equipment compatibility for communications. During 1983 Personal Computers were acquired from Texas Instruments, Compag, Osborne and Seequa, Vector Graphics and IBM. The computers are being used Department-wide for data base management, communications programs, statistical analysis and administrative support activities.

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# INFORMATION SYSTEM FOR SCHOOL DISTRICTS

TARGET AUDIENCE: School policy boards, district managers and school administrators.

AWARD: Grant NIE-G-83-0004 12/01/1982 to 11/30/1984 Cost: $46,000

The student information systems project is part of the Learning Research and Development Center's school district evaluation research program. The project works cooperatively with the Pittsburgh Public School District to improve educational decision-making at the district and at the school level. Research and development at the school level is based on themes that have emerged from case study investigations conducted at the district level. One of these, the role of principal as instructional leader, shows that principals are better able to monitor how instruction is proceeding in their buildings when they have ready access to a more detailed level of information than what the district needs to conduct its monitoring and tailoring functions.

The computer is a tool ideally suited to managing such information. The project has been examining the requirements for a school data base management system (SDBMS) and developing a prototype within the context of an elementary school. This SDBMS is designed to complement the information system that is being designed for district-level application, but it also includes classroom-level data that describes both process and outcome aspects of the instruction and learning which takes place in the school. One system is now being tried out at a school in the Pittsburgh District that has been targeted for special efforts at school improvement. Revision of this system is scheduled for 1984.

MAJOR PRODUCTS: Case histories presented in a form that will provide practical assistance to school districts, a school-level data base management system, and a formative evaluation of the utilization of that system.

PROJECT DIRECTOR:

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## COMPUTERS IN SCHOOL-BASED EVALUATION SYSTEMS

TARGET AUDIENCE: District and school administrators

AWARD: Grant #NIE-G-83-001 12/01/1983 to 11/30/1984
Cost: Part of a larger Center award

This study is part of a larger project investigating comprehensive school-based evaluation systems at the secondary level that can facilitate school renewal and improvement. It examines hardware and software options at both the district and school for establishing useful information systems that can support a variety of decision-making needs. It is anticipated that such systems will be needed to be online and user-friendly, providing easy entry and access and enabling flexible analysis to meet multiple information needs at the individual, classroom, grade, school and district levels. Strategies for utilizing available district and school resources to maximize the power of school-based microcomputers are being examined. The feasibility of using micros for instrument design and data collection as well as for analysis and reporting are also being explored. Human resource, hardware and software issues are considered within the context of real world constraints.

MAJOR PRODUCTS: Technical report on hardware, software, and human resource requirements for establishing school-based comprehensive information systems.

| PROJECT DIRECTORS: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Leigh Burstein and<br>Ken Sirotnik<br>Center for the Study of Evaluation<br>UCLA<br>405 Hilgard Avenue<br>Los Angeles, California 90024<br>(213) 825-4711 | Norman Gold<br>National Institute of Education<br>Program on Teaching and Learning<br>Testing, Assessment and Evaluation<br>1200 19th Street, N.W.<br>Washington, D.C. 20208<br>(202) 254-6271 |

## INSTRUCTIONAL ACCOMPLISHMENT INFORMATION SYSTEMS (IAI)

TARGET AUDIENCE: Faculty and educational administrators at the school, district and state levels.

AWARD: Contract 400-82-008 12/01/1982 to 11/30/1984
Cost: Part of larger Laboratory award

An IAI system provides the information to show the consequences of what students are now being taught at the elementary level, grade-by-grade and subject-by-subject. IAI reports are tied to detailed analyses of the instructional materials and by the skills or topics that receive an investment of instructional time in a given subject area, enabling the school community to define and deal with "task on time".

IAI systems use mainframe computers to provide the following functions: (1) The school subject analysis functions enable descriptions of the structure of instructional programs within and across grades; (2) Surveying functions apply survey research methodology to generate student performance data bases; (3) Reporting functions yield information reports for various elements of a school district; (4) Schooling analysis functions yield interpretations that tie together instructional accomplishments, schooling practices, and information about student population characteristics.

IAI systems are being implemented in collaboration with State and local education agencies and now feature some procedures to identify a few critical skills that are needed the most by students to increase their chances of academic success.

MAJOR PRODUCTS: Operating software for multiple mainframe computers to help administrators use this information to improve student performance.

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## SECONDARY SCHOOL INSTRUCTIONAL PLANNING SYSTEM (SSPS)

TARGET AUDIENCE: Faculty and administrators at the department, school and district levels.

AWARD: Contract 400-83-008, 12/1/82 to 11/30/84
Cost: Part of larger Laboratory award

This computer information management system is a secondary school parellel to the elementary level Instructional Accomplishment Information Systems, IAI. The system focuses attention on those students who are considered remedial--for whom the full range of course options offered by the secondary school is restricted. The system provides a means of identifying mathematics and reading skill prerequisites of secondary students that correspond to secondary school course and program requirements. It includes planning and instructional mechanisms to open as many course patterns to as many students as possible. Throughout the planning process mainframe computers and allied equipment function to create and make accessible data bases that inform and organize the sequence of instructional planning activities.

Since the individual school district is the prime system user it is possible to take advantage of the full computer power available within and external to the district. The planning at the school level is under the direction of the principal and includes attention to the departmentalized structure of the school.

MAJOR PRODUCTS: Operating software for a mainframe computer, implementation materials, a manual which provides user information, and planning guidance.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
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## COMPUTER-AIDED SCHOOL ADMINISTRATION (CASA)

| | |
|---|---|
| TARGET AUDIENCE: | Educational administrators ranging from building principals to superintendents and board of education members. |

AWARD: Contract 400-82-0008 12/01/1982 to 11/30/1984
Cost: Part of larger Laborary award

School districts currently make regular use of standard business, word processing, and statistical applications of computers. However, computer applications for the administration of schooling as such--the "business" of instructing students--have yet to be developed. Inquiry is being conducted to address the various ways computers can aid school administrators, particularly at levels above the school site but with information aggregated up from the student-teacher level.

Micro computers with a hard disc capacity or mini computers are used to access this District Executive Browsing System that will provide desk top access to instructional accomplishments, demographic characteristics, and instructional practices. Administrators don't need to know programing language to use this system which is menu-driven and interactive--permitting "what-if" planning on the basis of "what-is" status. The System is being implemented in collaboration with State and local education agencies.

| | |
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| MAJOR PRODUCTS: | Operating software is compatible with Texas Instruments 990 and will be compatible with Apple II-E and the IBM Personal Computer. Manuals are available to help administrators use the system and resulting information. |

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
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## GOAL BASED EDUCATION PROGRAM

TARGET AUDIENCE: Teachers and administrators who are interested in implementing goal-based education practices in their schools.

AWARD: Contract 400-83-0005 12/01/1982 - 11/30/1984 Cost $496,000

The program is: 1. Providing information about actual local practices that have been successful in achieving some part or all of the goals: improved excellence, effectiveness, and accountability. 2. Providing service, in the form of technical assistance, to schools in the region that wish to incorporate such practices into their own school improvement efforts. 3. Conducting field based research on the process of incorporating effective practices into individual local improvement efforts and on how the incorporation effects student achievement. 4. Disseminating the information about practices, implementation options, and effects on performance throughout the region and the nation.

Computer managed instruction is an essential management component in tracking the progress of large numbers of students through the individually prescribed instructional programs that are a part of any goal based educational program. Thus the computer activity involved in this program is computer managed instruction.

MAJOR PRODUCTS: Over the past three years, the program has developed and disseminated a number of products to schools, districts, states and university personnel. The products include: A Directory of Goal-Based Approaches to Education which describes 100 programs that have goal-based characteristics, a series of Program Profiles that describe in detail exemplary goal-based approaches being used in schools, school districts, and States. Some Profiles describe important resources to facilitate the various goal-based practices. A book Competency Based Education: Beyond Minimum Competency Testing, describes some basic concepts of competency based education and highlights schools and school districts using such practices. An Occasional Paper: Improving Instructional Management with Microcomputers describes qualities of good instructional management and shows how microcomputers can facilitate management decision making and record keeping. An Implementation Handbook gives advice on how to implement goal-based approaches to education.

| PROJECT DIRECTOR: | ED DEPT. CONTACT PERSON: |
|---|---|
| Robert E. Blum<br>Coordinator<br>Goal Based Ed. Program<br>Northwest Regional Educational Laboratory<br>300 S.W. Sixth Avenue<br>Portland, Oregon 97204<br>(503) 248-6800 | Richard B. Otte<br>National Institute of Education<br>Program on Dissemination and Improvement of Practice<br>1200 19th Street, N.W.<br>Washington, D.C. 20208<br>(202) 254-5654 |

## PLANNING MODELS FOR LOCAL SCHOOL DISTRICT DECISION MAKERS

TARGET AUDIENCE: School District Planners

AWARD: Contract NIE-G-83-0003 12/01/1983-11/30/1984 Cost: $238,024

A Project to develop a computer simulation model that will enable school districts to conduct their planning activities more effectively. Reports include a description of the allocative and curricular decisions, linkages between budget determination process and establishment of curriculum policy and a comparative analysis of prior planning models for local school districts.

The project will develop software for micro-computers to be used by school district planners to simulate the resource requirements of various policy options. This project is important because it will provide school district decision-makers with a comprehensive set of planning tools that will enable these individuals to apply the power of microcomputers to serve their planning needs. The major project activities focus on a combination of research, development, demonstration, training and field testing.

MAJOR PRODUCTS: Report: Comparative Analysis

Report: Assessment of the Model

Planning Tool Package: Final Products

PROJECT DIRECTOR:

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## CHAPTER 1 EVALUATION TECHNICAL ASSISTANCE CENTERS (TAC'S)

TARGET AUDIENCE: State and local administrators and teachers in Chapter 1, ECIA projects

AWARD: 300-82-0374 10/01/1982 to 9/30/1985
Cost: ($5.2 million for 4 TAC's in FY 83; $5.6 million in FY 84)

Within the context of providing technical assistance to State and local education agencies in order to improve the quality and utility of Chapter 1 project evaluations, TAC's have been requested by the SEA's and LEA's to develop several workshops, presentations and materials related to microcomputers.

Generally, these efforts take two forms: materials or presentations related to direct use of microcomputers in Chapter 1 evaluation administration (e.g., quality control of student test scores, use of computers to aggregate local information and produce a State-level report, building of district data bases) and information regarding the evaluation of educational software. The TAC's do not directly provide information about courseware, but have developed materials to assist districts in evaluating software they are considering.

In addition, TAC's act upon individual State requests to assist in the adaptation of computer programs that would be used to develop State evaluations, e.g., Visicalc, dBase II. The TAC's do not actually do much programming, but are familiar with the features of spreadsheet, data base management, word processing and graphics packages and can assist States and districts in tailoring such programs for their own needs.

MAJOR PRODUCTS: Videotape - "Microcomputer Selection." (Available from any of the 4 TAC's) Workshop - "Microcomputers in Chapter I Evaluation" (Available from region 4 TAC, Northwest Educational Research Laboratory, Portland, Oregon). An integrated multi-day workshop, with stand-alone components, encompassing: demystifying the computer, overview of evaluation applications, use of software, and planning. Other - presentations and products developed to meet the needs of individual States.

| PROJECTS DIRECTORS: | ED. DEPT. CONTACT PERSON |
|---|---|
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# COMPUTER AIDED POLICY PLANNING AND ANALYSIS (CAPPA)

TARGET AUDIENCE: State level educational administrators, analysts, and policy makers.

AWARD: Contract 400-82-0008, 12/1/82 to 11/30/84
Cost: Part of larger Laboratory award

Computer Aided Policy Planning and Analysis is parallel the computer aided schools administration CASA, system. The software available for mainframe mini or micro computer is targeted for high-level administrators who must analyze an organization's or sector's productivity, procedures, staffing, finances, etc., and then make policy recommendations.

SWRL's initial inquiry in this CAPPA system is called Proplan. The inquiry moves from the broad experience that two-way statistical tables--tables with rows and columns--are a versatile framework for arraying and analyzing the information in a data base. Business systems such as Visicalc and Digicalc allow professionals to change rows, columns, and cell entires of a spread-sheet to explore and examine "what if" planning possibilities. Proplan is an extension of this logic for public program policy planning.

Proplan is a menu-driven desk-top system that requires no previous experience with computers. Because human service policy planning and analysis is conducted by sector (e.g., education, transportation) and by governmental unit (e.g., State, county, local), Proplan functions within these boundaries. For any given sector, Proplan permits the user to view indicators structured in three categories: accomplishments/benefits, demographic/political characteristics, and key practices/operations. Proplan menus permit browsing within and/or across the information in the three categories and looking in on this information at the level of the administrative structure of interest. Proplan allows for three administrative levels--a top, a bottom and an intermediate level, in recognition that three levels provide for about as much hierarchical depth as a public program can manage.

Proplan system design and software are being developed for initial use in State education agencies which have large scale data collection activities and data management needs.

MAJOR PRODUCTS: Operating software-hard disks for micro mini and mainframe computers. User manuals and planning guidance.

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## THE DEVELOPMENT OF A COMPUTER DATA SYSTEM FOR ACCESSIBLE DESIGN AND REMOVAL OF ARCHITECTURAL BARRIERS

TARGET AUDIENCE: Architects and facilities planners, manufacturers, builders and the disabled community

AWARD: Contract 400-83-0037 10/1983-4/1984 Cost: $39,162

This project will develop a model plan for analyzing architectural barriers as well as recommending generalized methods for overcoming such barriers in public and private buildings. It includes the research and development of a computer data software system which will organize and store the large amount of information needed into a manageable retrieval system that will guide the user through the decision making process and the other steps necessary to 1) identify barriers; 2) learn about state-of-the art design standards applicable to their project; 3) determine alternative possible design solutions for meeting the technical specifications of the standards; 4) determine optimal as well as most cost-efficient design solutions; 5) identify products useful for meeting the technical specifications of the standards; and 6) determine costs of each proposed or required accessible feature. The proposed system would allow the user random access to retrieve this information by specific building types and/or building element. For projects involving renovation of existing buildings, the data system will provide procedures to assist the user in determining priorities for modifications.

MAJOR PRODUCTS: A computerized data system to show the building industry, manufacturers, and the disabled community new standards, better methods for achieving accessibility, and useful products.

PROJECT DIRECTOR:

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## IV. RESEARCH AND EVALUATION

A. Research on Computer Use
  1. Research on General Computer Use
  2. Research on Classroom Use of Computers
  3. Research on Computer Use Within Specific Populations

B. Evaluation of Computer Courseware and Computer Education Activities
  1. Assessment of Computer Education Courseware
  2. Evaluations of Computer Education Activities

C. Using Computers for Basic Research on Learning

D. Using Computers to Retrieve or Process R&D Information

# MULTI-NATIONAL STUDY OF NEW TECHNOLOGIES IN EDUCATION

TARGET AUDIENCE: Educational researchers, planners, decision makers at all levels, teachers, administrators, and others interested in the development and application of technology to education.

AWARD: This is a collaborative effort among 17 nations; no award is involved. The period of the activity is October 1982 to Spring 1986.

As the result of recommendations of the Third Conference of Ministers of Education of Member States of the European Region of UNESCO (to which the United States and Canada belong), held in Sophia, June 1980, and subsequent meetings of experts, 17-nations have joined together to conduct a comprehensive study of the ways in which technology is developing and being applied to education in their countries. Particular attention will be paid to computers, videotex/teletext, interactive video (including videodisc), communications satellites, teleconferencing (audio/video/computer), as well as other new developments in video, audio and audiographics.

Three major activities are planned. First, country-by-country reviews of current and planned applications of new technologies in education are being prepared. Second, in-depth case studies of significant educational applications of technology in the participating countries will be developed. Third, a series of papers, written from the standpoint of different nations will be prepared on key issues that underlie the successful application of technology to education.

MAJOR PRODUCT: At least two lengthy reports will be prepared. The first dealing with the national reviews will be published by UNESCO and made available in English, French and Spanish.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
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## NATIONAL EDUCATIONAL TECHNOLOGY CENTER

TARGET AUDIENCE: Educators interested in research on computers particularly in the area of elementary and secondary school mathematics and science

AWARD: 0400-83-0041 9/29/1983 to 2/28/1989 Cost: $7,681,534

The Center, funded by the National Institute of Education as the newest of its 17 labs and centers, examines the present and potential role of technology in education. It concentrates its efforts on the role computers can play in the teaching and learning of math and science, and on the ways students learn about computers themselves. Center activities include: (1) continuing attention throughout its activities to the research agenda in this fast-moving fields, (2) a major research project designed to identify targets of difficulty in math, science, and computer education, and to assess the role computers might play in easing these, (3) several smaller research projects focusing on specific technologies likely to be useful educationally in the near future, such as speech-recognition devices, intelligent microcomputer-driven videodisc players, and the downloading of computer software in conjunction with broadcast television, (4) a range of graduate-level training activities, including both traditional academic programs and specialized, short-term institutes on computing in schools offered in different States, and (5) dissemination of center activities to educators and parents and complementary gathering of questions which arise in educational practice to serve as the basis for the center's agenda-building efforts. The center is a collaborative venture led by the Harvard Graduate School of Education and comprising the Educational Testing Service (ETS), the Educational Development Center (EDC), The WGBH Educational Foundation, the Children's Television Workshop (CTW), Interactive Training Systems (ITS), the Educational Collaborative of Greater Boston (EDCO), and the Public School Systems of Cambridge, Newton, and Watertown, Massachusetts. Harvard manages and houses the center, and is responsible for most of the work under item (2) above. ETS and EDC are also involved in the math/science/computer work; in addition, each of these organizations plays a major role in dissemination activities, and EDC plays an important role in the speech-recognition research. WGBH and CTW concentrate on the broadcast-downloading research, and EDC concentrates on research involving interactive videodisc devices. EDCO and the four school systems play a variety of roles in the center's work, the most important being intensive involvement in the research-agenda work and the math/science/computer research.

MAJOR PRODUCTS: A research agenda, research reports, graduate training opportunities.

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# RESEARCH CONFERENCE ON THE POTENTIAL OF COMPUTERS IN EDUCATION

TARGET AUDIENCE: Educational researchers, cognitive scientists, teachers, computer education personnel

AWARD: Contract 300-82-0346 10/01/1982 to 5/30/1983 Cost: $84,984

The Office of Educational Research and Improvement sponsored a conference in Pittsburgh, Pennsylvania, in late November 1982 at which forty teachers, educational researchers, and scientists from the public and private sector gathered to discuss the future of computers in education, and the research required to realize the educational potential of this powerful tool.

The report, which refers to the computer as "one-in-several-centuries innovation," deals with the following topics:

- New educational needs resulting from society's increasing dependence upon computer power and information technologies.
- Opportunity for educational improvement offered by recent developers in cognitive science and advanced computer capabilities in such applications as tutoring, creating exploratory learning environments, diagnosis, networking, and game technologies; and in the computer's capacity as an intellectual tool for students and teachers as well as an administrative aid to increase teacher productivity.
- Recommendations for actions required to realize this opportunity, including a call for a sustained national investment in basic research on cognitive issues and artificial intelligence, associated applied research on enhanced design principles for human-computer systems for education, and support for prototype research in which these basic principles are refined by trial and pilot applications in the classroom.
- Suggestions for implementation of the recommendations through the establishment of research centers dedicated to applying technology and new knowledge of human cognition to improving education.

MAJOR PRODUCTS:

Two reports: Computers in Education: Realizing the Potential; (Volume I) Chairman's Report of a Research Conference; (Volume II) Full Proceedings of the Research Conference available through the U.S. Government Printing Office, Washington, D.C. 20402. Volume I costs $3.75 (Request stock number S/N-065-000-00187-0). Volume II costs $6.50. (Request stock number S/N-065-000-00188-8).

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## NCES/GWU TELECOMMUNICATIONS STUDIES PANEL

TARGET AUDIENCE: The Telecommunications Community: Government industry, education institutions and organizations.

AWARD: Contract #300-83-0116 1/28/1983 to 1/28/1984 Cost: $9,987

As part of its planned program for data collection and analysis, the National Center for Education Statistics is charged by the Secretary's Technology Initiative to establish a comprehensive data base on educational technology. One of the proposed strategies for fulfilling this mission was to convene a panel of experts in the field of telecommunications statistics; such panel meetings were conducted by the Center for Telecommunications Studies at George Washington University.

The panel was important both to NCES and the telecommunications community. NCES used this panel as a way to maintain close coordination and communication with associations, research organizations, etc., and received input concerning NCES's activities. The telecommunications community was able to maintain a close working relationship with NCES, was kept abreast of any activities which might affect them, and had the opportunity to respond to these activities. Topics covered the full range of telecommunications, including direct broadcast satellites, public television, ITFS, teleconferences, video disc, and microcomputer uses in higher education.

The purpose of this project was to have representatives of various constituencies from the telecommunications community meet to provide a forum whereby NCES received recommendations for its data collection activities.

MAJOR PRODUCT: Summaries of proceedings, including panel recommendations. Three reports are available: one each from the May 1983 Panel I meeting; from the August 1983 Panel II meeting; and from the December 1983 Panel III meeting.

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# COMPUTER LITERACY IN ELEMENTARY AND SECONDARY SCHOOLS

TARGET AUDIENCE: Elementary-secondary teachers, administrators, education researchers

AWARD: Contract 400-82-0024 10/01/1982 to 9/30/1983
Cost: $134,000 (NCES - $109,000 OERI - $25,000)

A panel of 10 experts on the uses of computers in education served as advisors on each phase of the project that included: (1) the definition of computer literacy, (2) development of a conceptual structure of computer literacy, (3) writing survey questions that may be used to assess computer literacy in schools, and (4) a field test of the survey questions.

Computer literacy, as it applies to schools, was conceptualized as having 7 dimensions: (1) establishing and administering computer-related educational policies; (2) teaching with and about computers; (3) using computers to aid in learning, solving problems and managing information; (4) developing and applying algorithums, and writing computer programs; (5) analyzing applications of computers; (6) understanding social issues; and (7) using computer concepts and terminology.

Several hundred objective statements that delineated each of the dimensions were rated by the panel with respect to their importance in evaluating computer literacy among superintendents, principals, teachers, and students. The objective statements that were judged important served as specifications for writing survey questions. The survey questions were field tested in 9 schools in 3 States, and revisions were made as needed.

MAJOR PRODUCTS: Working definition and pool of survey questions. Final Report: Computer Literacy: Definition and Survey Items for Assessment in Schools (Winter, 1984).

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
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# INSTRUCTIONAL USE OF COMPUTERS IN PUBLIC SCHOOLS

TARGET AUDIENCE: Educators and administrators interested in the nature and extent of public school use of computers for instruction.

This survey conducted by the National Center for Education Statistics through its Fast Response Survey System was requested by the Office of Educational Research and Improvement to provide a better understanding of the status of computer-based instruction, specific instructional applications of computers in schools, and the resources needed by schools to improve computer-based education. In April 1982, questionnaires were mailed to a national probability sample of 900 schools representing 82,000 public schools in the nation. Data collection was completed in May with a response rate of 92 percent.

Two reports have been developed based on the survey findings. An early release, which was first made available to the public in September 1982, provided information on the number of schools with computers for instruction, the number of computers available, the hours of student exposure, major instructional applications, major software needs, and requirements to initiate or improve computer-based instruction.

A final report based on the survey findings will be available from the Government Printing Office around March or April 1984. This report will discuss in greater depth the findings of the early release and will analyze them by the school's instructional level, geographic region, and metropolitan status.

MAJOR PRODUCT: Instructional Use of Computers in Public Schools

- Early release September 1982
- Final report scheduled for March/April 1984.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
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## MICROCOMPUTERS IN CLASSROOMS: ASSESSING AND IMPROVING THEIR USEFULNESS

TARGET AUDIENCE: School principals, district administrators and policy-makers

AWARD: Contract NIE-G-81-0009 12/1982 to 12/1985
Cost: Part of larger Center award

This project is a series of periodic surveys of school personnel, concentrating in particular on those schools currently using microcomputers, but including stratigied samples of all public, private and parochial schools in the United States. The survey fielded in October, 1982, is an outgrowth of an extensive review of the literature on instructional uses of computers (Becker, 1982). The plan for 1983 calls for thorough analysis of the survey data and for a more detailed follow-up survey of a sub-group of the 1982 survey participants. This subgroup will constitute a panel of articulate practicing educators who are major users of micro-computers in the classroom.

The baseline survey of current microcomputer users fielded in the Fall of 1982 will address four specific areas: 1) the nature of their computer-related resources, e.g., teacher expertise, support from the school district, and the number of characteristics of their microcomputer and software acquisitions; 2) how students' access to computer resources is organized and the ways in which the equipment is used on a day-to-day basis; 3) brief evaluations of the various hardware and software products that they have used and a self-evaluation of program that they have developed to use the computers; and 4) any future plans they might have for changing how computers will be used for instruction at their school.

This study is unique in that it brings together the variety of school-based uses of microcomputers. The principal investigator is using a newsletter format of reporting that will periodically inform while updating the collected information.

MAJOR PRODUCTS: Microcomputers in the Classroom - January, 1982

Newsletter: School Uses of Microcomputers

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
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# THE USE OF COMPUTERS IN INSTRUCTION SUPPORTED UNDER CHAPTER I OF THE EDUCATION CONSOLIDATION AND IMPROVEMENT ACT

TARGET AUDIENCE: Federal education policymakers and educators at State and local levels.

AWARD: Contract 300-82-0375 (With Advanced Technology, Inc.)
9/1983 - Cost: $5,600

The main vehicle available at the federal level for addressing inequities in the instructional opportunities provided to disadvantaged students is the program of educational assistance authorized by Chapter 1 of the Education Consolidation and Improvement Act (ECIA). Recent survey results suggest that Chapter 1 may be a major source of funds for the acquisition of computer in schools.

Growing numbers of local Chapter 1 projects are acquiring and using computers in the provision of compensatory instruction. Although Chapter 1 students have access to fewer computers for less time and are more likely to use the computer for drill and practice activities than non Chapter 1 students. Chapter 1 school comparisons with non-chapter 1 schools are confusing because more of the schools are elementary level than the non-chapter 1 schools.

It seems clear that the introduction of computers into Chapter 1 projects--or into the regular instructional program--will not itself improve learning. Improvement will be realized only to the extent that these technological tools advance the particular instructional objectives of the Chapter 1 project. Achieving these improvements requires careful local planning in the acquisition and use of both hardware and software.

The federal government can assist planning in two ways. First, it can make certain that SEA's and local projects understand alternatives for complying with the Chapter 1 prohibition on general aid. This clarification would eliminate a hurdle that is reportedly impeding some projects from using Chapter 1 funds to acquire and use computers. Second, the federal government can provide opportunities for technical assistance in the planning and provision of computer-related instruction under Chapter 1. This help should focus on ways of integrating Chapter 1 instruction using computers into the regular instructional program.

MAJOR PRODUCTS: A September 1983 report.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Elizabeth R. Reisner<br>Policy Studies Associate, Inc.<br>1503 Twenty-first Street, N.W.<br>Washington, D.C. 20036<br>(202) 296-4460 | Robert Stonehill<br>Office of Planning, Budget and Evaluation<br>400 Maryland Avenue, S.W.<br>Room 4032<br>Washington, D.C. 20202<br>(202) 245-9401 |

## HARDWORK: SOFTWARE

TARGET AUDIENCE: Education policy-makers

AWARD: Individual contracts 7/1983-9/1983 Cost: $25,000

This conference focuses on two comprehensive issues with respect to educational software: software "piracy" and the allegedly poor quality of software. Each of these two problems is an impediment to the computer revolution in the schools. With regard to software "piracy," teachers are buying only single copies of software and reproducing them for use by groups of students. This creates a disincentive for software manufactures to produce software for sale to schools and to assign their best talent to creating educational software. With regard to the quality of software, it has been alleged that much of the educational software available is (or has been) of poor quality. It will be the purpose of this conference to explore the truth of this allegation. Overall, this conference will serve the needs of educational policymakers by providing them with a forum to discuss two very contemporaneous concerns of theirs.

MAJOR PRODUCTS: Videotape of Conference Proceedings
Monograph of Conference Proceedings 12/1983

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# COMMITTEE ON RESEARCH IN MATHEMATICS, SCIENCE AND TECHNOLOGY EDUCATION

TARGET AUDIENCE: The Committee, which will be formed by the National Research Council of the National Academy of Sciences, will provide advice to the National Institute of Education.

AWARD: 400-83-0059 9/30/1983 to 9/30/1984 Cost: $100,000

The Committee will provide guidance to NIE on current research needs in mathematics, science and technology education, including computers, which can appropriately and effectively be addressed by NIE activities. The Committee, to be composed of approximately twelve distinguished individuals drawn from the physical, biological, behavioral and social sciences, and mathematics, together with experts in the field of education, will be concerned with improving the knowledge base relevant to education in mathematics, science and technology, including computers, and with application of research knowledge to educational practice. Over an initial one-year period, the Committee will hold two meetings, commission at least five papers, conduct a workshop, and develop recommendations to the National Institute of Education on research needs and possible Institute activities.

MAJOR PRODUCT: Five papers on research areas in mathematics, science and technology education; proceedings of the workshop; and a final report containing recommendations to the Institute.

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## BUSINESS AND PUBLIC SCHOOL PARTNERSHIPS: FOCUS ON EDUCATIONAL TECHNOLOGY

TARGET AUDIENCE: Educational policy-makers and computer businesses

AWARD: Purchase Orders to Paper Authors 9/15/1983-4/30/1984
Total Cost: $20,700

A set of papers is being commissioned to identify a variety of business-school partnerships that involve the use of computers and other technological devices to improve the effectiveness of schools. Since technological literacy appears to be a critical factor, these papers will describe in detail significant aspects of innovative programs to identify the optimum roles for involved parties on issues relating to technological literacy.

Three of the nine papers will be prepared by the employees of Hewlett Packard, Raytheon Data Systems, and Honeywell who administer these corporations' programs for partnerships with schools. Another set of three papers will be prepared by superintendents Billy Reagan of Houston, Texas, John Collins of Los Gatos, California, and Francis Discoll of Oxford, Massachusetts who designed innovative programs and are presently in charge of them. Two papers by Paul Barton of NIWL and Barbara Bowen of the Apple Education Foundation will analyze the role of intermediary groups. Dr. Elizabeth Useem will discuss these issues on a national perspective.

MAJOR PRODUCTS:

- The People Link: High Technology Industries and Educational Partnerships by Gary Gubitz
- Project Access: Raytheon's Involvement in the Public School System by Bo White
- An Educational Partnership on Curriculum, Careers, Technical Support, and Technology: A Honeywell Approach by Rita Kaplan
- Technology in Schools: A Business School Partnership in Houston by Billy J. Reagan
- Los Gatos-Saratoga Joint Union High School District: A Case History of Business and School Collaboration on High Technology Concerns by John Collins
- Oxford/Digital Partnership by Francis G. Driscoll
- New Learning Technologies Through Intermediary Organizations by Paul Barton
- Microcomputers: Tool for Enhanced Learning: Apple Foundation's Perspective by Barbara L. Bowen
- Significant Issues Relating to Educational Technology in School/Business Partnership by Elizabeth Useem

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# EFFECTIVE COMPUTERS IN SCHOOL:
# STATE ISSUES AND OPTIONS

TARGET AUDIENCE: State Policy-makers including Governors, State Legislatures, Chief State School Officers, their respective staffs and other interested parties

AWARD: Purchase Orders to Authors 9/01/1983-8/31/1984
Total Cost: $45,000

This is a set of papers about the use of computers. This project is one of the first of its kind to layout for State officials and other interested parties to issues they must face when designing or refining State issues and policies to help schools use computers more effectively. Major project activities focus primarily on research and dissemination.

MAJOR PRODUCTS: State Policies and Strategies for the Development and Dissemination of Software by Ken Brumbaugh

State and Local Intergovernmental Issues in the Educational Use of Computers by Stan Pogrow

Determining State Policy Needs and Planning Strategies for Computers in Education by Charles Boashke

Software Evaluation by Judy Edwards Allen

The State Role in Providing and/or Facilitating Technical Assistance in Computer Education by Sandy Wagner

State Policy Issues and Models for the Preparation and Certification of Educational Personnel to Use Computers Effectively in Schools by Allen Hofmeister

State Curriculum Policy Implications of Instruction for and with Computers by Allen Lesgold

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## SOCIAL INTERACTION IN YOUNG CHILDREN'S LEARNING ABOUT COMPUTERS

TARGET AUDIENCE: Preschool teachers, early childhood researchers, cognitive researchers.

AWARD: NIE-G-83-0069 7/1984 to 9/1984 Cost: $176,000

This project is comprised of four studies of young children's social interactions at a computer. The view that interacting with computers is a solitary activity needs to be examined critically. In fact, computers may provide a unique opportunity for cognitively oriented social interaction and acquisition of problem-solving skills. In the proposed research, preschool children will be given brief training in Logo, a computer language designed especially to teach problem-solving skills to children. The, the extent to which they work together at the computer, and act as problem-solving resources for each other will be observed. The observations will focus specifically on children's questions and instructions to each other in the course of their normal problem solving. Age differences in the circumstances and quality of question asking and instructing will be compared over the 3 to 5 year age span. In addition, peer, mixed-age, and mixed-experience dyads will be observed. These various dyad groupings will permit assessment of young children's ability to adapt their instructions to the level of a partner, as well as to determine the degree to which developmental level and experience with Logo affect question asking and instructing. Finally, children will be given unrestricted access to the computer for an extended time period. This portion of the research will permit determination of whether young children continue to be interested in computers and assist each other in their use. The proposed project should provide new knowledge about social interactional influences on early cognitive skill acquisition, as well as answer questions about how young children can be introduced to computers, and the circumstances most appropriate for such introduction.

MAJOR PRODUCTS: Final report.

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# ROLE OF INCENTIVES AND REWARDS IN IMPLEMENTING A TECHNOLOGICAL INNOVATION

TARGET AUDIENCE: Educators and researchers concerned with the use of computers in schools.

AWARD: NIE-G-83-0062 10/01/1983 to 3/31/1985 Cost: $148,600

This project seeks to understand the role of incentives and rewards in motivating teachers to improve their practice in three important areas: the use of new technology, the teaching of writing, and classroom management. The vehicle for improvement is a program called QUILL, a set of microcomputer-based writing activities for grades three through six. It combines up-to-date technology with sound teaching strategies. The study will examine teachers' motivations and experiences as they implement QUILL in their classrooms.

Case studies will be developed of eight teachers who are involved with QUILL, two in each of four schools, each in a different school district. In site visits, researchers will explore the motivations behind the teachers' participation, the incentives, and the rewards that accrue from the use of QUILL. The influence of factors such as type of student population, prior experience of the teacher with technology, the assistance provided by the principal and/or district level staff, and the collegiality of the school staff on the development of different incentives and the resulting rewards will be examined. The implementation and institutionalization of QUILL in the classrooms and schools will be assessed and related to teacher incentives and rewards.

The case studies will help unsnarl the complicated relationship between what teachers do and why they do it. The resulting findings can both inform the research community and serve as a guide to educators who are responsible for designing, promoting, and managing the improvement of schools.

MAJOR PRODUCTS: Case studies.

PROJECT DIRECTOR:

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National Institute of Education
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Teaching and Instruction
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## MICROCOMPUTERS AND LITERACY: THE IMPACT OF INTERACTIVE TECHNOLOGY ON CLASSROOM ORGANIZATION, TEACHER-STUDENT INTERACTION, AND STUDENT WRITING

TARGET AUDIENCE: Elementary teachers, writing researchers, educational technology coordinators.

AWARD: Contract NIE-G-83-0051 9/30/1983 to 9/29/1985
Cost: $318,639

Decisions are being made at federal, state, and local levels to introduce interactive technology into classrooms. Yet very little is known about the impact that microcomputers have on classrooms and learning. Because computer technology is likely to have a major impact on writing, this 3-year study investigates the impacts that interactive writing software (specifically, QUILL) have on classroom organization, teacher-student and peer-peer interaction, and student literacy.

The study will be conducted in 5th-grade classrooms of an ethnically and economically diverse urban school. The first year will compare two classrooms (one traditionally structured, one activity-centered) without microcomputers to determine how the introduction of interactive technology changes teachers' classroom organization. In the second year, a small sample of children will be closely followed in all phases of their computer-assisted and non-computer-assisted writing to determine ways in which the process of writing is affected by the use of interactive technology, and how the resulting written pieces compare in form, content, style, audience, and purpose. The third year will involve monitoring the introduction of an interactive writing program and microcomputers into two classrooms with improved user materials developed from the first two years of the project.

MAJOR PRODUCTS: Final report, improved user manuals, writing software, and training materials.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
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240

# A QUASI EXPERIMENT IN GUIDED CHANGE

TARGET AUDIENCE: Elementary school teachers, cognitive researchers, software developers.

AWARD: NIE-G-83-0027 9/01/1983 to 8/31/1984 Cost: $103,818

As schools acquire and use microcomputers for educational purposes, we are concerned with the way this form of technology is implemented with children of differing ability and background. We propose to investigate the equalizing and stratifying aspects of computer use by testing the usefulness of a special variety of microcomputer educational programs for teaching basic cognitive skills. Software packages which encourage social interaction among learners will be introduced into a small number of elementary school classrooms, each of which will have a primary curricular focus in either reading or math or writing. We will compare the performance of students who receive instruction in these basic skills in a computer supported instructional system with the performance of students who receive regular classroom instruction in these subject areas. The process of computer learning will be examined by studying keystroke information retrieved from the computer, audio and videotapes of teacher-student-computer interaction. Our ethnographic observations and analysis of videotape records will provide data on the processes of instruction when computers are being used and when computers are not being used for instruction, which will enable us to examine changes in classroom structure that are vital to an equitable integration of computers into education.

MAJOR PRODUCTS: Final report

PROJECT DIRECTOR:

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# MICROCOMPUTERS IN EDUCATION

TARGET AUDIENCE: Educators using microcomputers in the classroom and researchers and publishers developing educational software

AWARD: Grant NIE-G-81-0009 12/01/80 to FY 1985
Cost: $20,000 FY 83, $60,000 FY 84

This project will help the Center for Individualized Schooling expand its own and others' knowledge about microcomputers and their applications in instructional settings. Activities include in-house training sessions, support to practitioners, an effort to learn about this new technology through surveying the literature, forming networks with others who have similar interests, and considering ways microcomputers can help in the Center's research program.

A major activity will be to identify salient characteristics in existing software to learn what makes certain programs interesting and useful for schools. This information will be used to develop an instrument which includes these criteria.

The Center will also assist practitioners by letting them review software available at the Center, conducting an annual conference, and assisting education microcomputer organizations.

MAJOR PRODUCTS:

- Guidelines for Using Microcomputers in the Classroom
- A newsletter "On Wisconsin Computing"
- An instrument containing criteria to evaluate important attributes of quality educational software and to use in designing software

PROJECT DIRECTOR:

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## TEACHER KNOWLEDGE AND COMPUTER USE

TARGET AUDIENCE: The Information gathered through this study will be used by school administrators, district personnel engaged in teacher inservice and preservice, schools of education and computer courseware developers.

AWARD: Contract 400-82-0006 6/01/82 to 10/30/83 Cost: $215,915

The study's purpose is to determine factors that lead to successful classroom microcomputer use, with emphasis on the kinds and levels of knowledge that leads to successful use by teachers, given specific computer uses, district and school policies, student characteristics, and teachers' attitudes toward computer use. The study has two policy objectives: first, to inform developers of educational programming so that they will be better able to consider teachers' needs in designing courseware. Second, to guide the development of training programs for teachers who will use microcomputers.

Naturalistic, observational studies of microcomputer use in science and mathematics classes at the elementary, junior high, and high school levels will be conducted. Data will be collected in school districts with microcomputers in classroom instruction use, but which vary in school district support for microcomputer use and technological sophistication. Teachers successfully using microcomputers in instruction will be interviewed and observed within each district. Evaluations of the microcomputer uses and software, reports of administrative policies, and teachers' subject matter and computer knowledge and instructional goals will be assessed through interviews. Varieties of microcomputer uses, the classroom environment, and the teachers' instructional methods will be observed directly. The results will yield recommendations for how teachers' classroom computer use can be improved through courseware design and training adapted to their knowledge needs.

MAJOR PRODUCTS: The final report will be suitable for school district and school administration personnel, teacher trainers, and courseware designers. Technical appendices will be included for the interested researcher.

PROJECT DIRECTOR:

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# EFFECTIVE INCENTIVES FOR TEACHERS' INSTRUCTIONAL USE OF COMPUTERS

TARGET AUDIENCE: Educators and researchers

AWARD: NIE-G-83-0045 9/30/1983 to 3/31/1985 Cost: $101,105

Although the computer is recognized as a remarkable tool in a teacher's repertoire for enhancing instructional quality, beneficial uses of the technology are far from realized. One significant barrier to more sophisticated educational applications of computer technology is a shortage of teachers who have the requisite skills and interest to integrate computers into their instruction.

This research will examine how districts and schools can stimulate teachers' successful instructional uses of computers. The influence of different forms of incentives and support for computer-using teachers will be examined with respect to two outcomes: teachers' participation in computer-related staff development, and the quality of teachers' computer-based instruction.

Two tasks will be conducted. During the first half of the study, secondary analyses will be performed on data collected in a study of successful computer-using teachers in California. During the second half of the study, results will be extended through a nationally-based telephone survey of computer-using districts, schools, and teachers.

Data analyses will formally test the relationship among types of incentives and support, and variables representing teachers' skills, attitudes, and behavior. Since the report will contain policy recommendations based on the benefits and limitations of various incentives for teachers' involvement with computers and their eventual instructional uses, the findings should be of interest to researchers, school administrators, and teachers.

MAJOR PRODUCT: Research report.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
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# AN INVESTIGATION OF THE INFLUENCE OF FOUR DIFFERENT COMPUTER RESPONSE MODES ON THE ACCURACY AND FREQUENCY OF RESPONDING BY PRESCHOOL-AGED HANDICAPPED CHILDREN

TARGET AUDIENCE: Educators of handicapped pre-school students.

AWARD: Grant G00-83-02223 9/01/1983 to 8/31/1984 Cost: $4,502

Computer assisted instruction in its usual forms demands that the child have certain mimimal capabilities that young handicapped children may not possess, such as reading and the ability to use a typewriter-like keyboard. In this study, four different methods of responding to the computer will be compared: the keyboard, a keyboard adaptation, the light pen, and the paddle. The study will examine the influence of type of response on frequency and accuracy of responses by preschool handicapped children in a learning program.

MAJOR PRODUCTS: Research report.

PROJECT DIRECTOR:

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# THE IMPACT OF MICROCOMPUTER INSTRUCTION ON HANDICAPPED STUDENTS

TARGET AUDIENCE: Educators of handicapped pre-school students.

AWARD: Grant G00-83-02862 10/01/1983 to 9/30/1985 Cost: $993,024

This application proposes a four-year research program to study whether microcomputers are an effective learning device for preschool handicapped children who are cognitively impaired, communicatively impaired, and multiply impaired. In addition to studying the overall effectiveness of computer assisted instruction for preschoolers, the investigators propose to study questions related to scheduling, type of instructional software (i.e., drill and practice, tutorial), location of microcomputers, and a range of administrative, logistical and organizational issues involved in implementing microcomputers into schools.

MAJOR PRODUCTS: Research reports.

PROJECT DIRECTOR:

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# INSTRUCTIONAL AND CONTEXTUAL VARIABLES IN EFFICACY OF COMPUTER-BASED INSTRUCTION FOR MILDLY HANDICAPPED SECONDARY STUDENTS

TARGET AUDIENCE: Educators of mildly handicapped secondary students.

AWARD: Grant G00-83-02863 10/01/1983 to 9/30/1987 Cost: $1,128,809

The goals of this project are 1) to analyze the impact of computer-based instruction on the academic achievement and amount of academic learning time provided to mildly handicapped secondary school students, 2) to measure both qualitatively and quantitatively the contextual and intrapersonal variable that may affect implementation of microcomputer-based instruction, 3) to analyze experimentally some interventions designed to increase the efficacy of microcomputer-based instruction for this group, and 4) to develop instructional packages and software that will enable a number of audiences to use the key findings in developing and using instructional programs for mildly handicapped students. These goals will be realized by conducting a series of studies, fairly independent in the first year, and becoming more interrelated later on as the results of earlier studies are fed into the specific content of the later ones. Research methods range from group comparisons to structured interviews to multiple baseline experiments, depending upon the research questions being asked. Many studies draw upon research previously conducted by the project staff, or currently under way, on related topics, applied here to microcomputer implementation.

MAJOR PRODUCTS: Research reports, institutional packages and software.

PROJECT DIRECTOR:

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# THE DEVELOPMENT OF MICROCOMPUTER SKILLS OF SPECIAL EDUCATION TEACHERS

TARGET AUDIENCE: Special education teachers

AWARD: Grant G00-83-00313 7/01/1983 to 6/30/1984 Cost: $36,346

The purpose of this project is to identify the various problems that special education teachers meet in using microcomputers in teaching handicapped children. A monograph will be produced for special education teachers who do not have access to microcomputers in the classroom.

MAJOR PRODUCT: A monograph for special education teachers

PROJECT DIRECTOR:

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# RESEARCH ON THE EFFECTIVENESS OF MICROCOMPUTERS IN SPECIAL EDUCATION

TARGET AUDIENCE: Cognitively impaired students.

AWARD: Grant G00-83-02828 10/01/1983 to 9/30/1987 Cost: $1,053,173

This study will examine the types and characteristics of computer-assisted instruction (CAI) likely to result in increased learning for cognitively impaired students. The project will, over four years, systematically study (1) factors related to the effectiveness of the practice; (2) tutorial; and (3) simulation and "intrinsic fantasy" games. For example, related to the drill and practice mode, the project will, through various students, examine the effects of "precorrection," cumulative sequencing, and immediate and delayed feedback. In addition, the project will study mediating variables such as motivation, or academic learning time, as well as factors such as response latency that can be used in instructional decision making. The project will also examine contextual factors that relate to the effectiveness of CAI, with particular emphasis on teacher roles and functions and student groups.

In the course of the study conventional research designs and statistical procedures will be used in the experimental research on effectiveness; the methods of naturalistic inquiry will be used in the research on contextual factors.

MAJOR PRODUCTS: Research reports.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
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# INVESTIGATION OF THE USE OF MICROCOMPUTERS IN TEACHING AUTISTIC CHILDREN

TARGET AUDIENCE: Teachers of autistic children.

AWARD: Grant G00-83-00360 6/01/1983 to 6/03/1984 Cost: $63,587

The purpose of this project is to study the use of microcomputers in the instruction of autistic children. Recent progress in the instruction of these students has depended on instructional delivery systems characterized by highly-trained teachers, low student-teacher ratios, an extensive individualized planning and recordkeeping. Even when instruction is optimal, student progress is often slow. Yet shortages in funds, qualified personnel, and programs often result in instruction which is far from optimal. In the opinion of the applicant, research on the instruction of autistic children must not focus exclusively upon the isolated development of specific instructional techniques, but must also consider alternative delivery systems which can employ these techniques practically and economically. In this regard, they are proposing the systematic investigation of microcomputers.

MAJOR PRODUCTS: Research reports.

PROJECT DIRECTOR:

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## CREATE TO LEARN

TARGET AUDIENCE: Educators of handicapped learners.

AWARD: Grant G00-83-02861 10/01/1983 to 9/30/1987 Cost: $998,910

This study proposes to carry out six programmatic thrusts related to the effective use of microcomputers with handicapped learners. Specifically, the project will examine a number of variables affecting learner motivation and performance, selection and adaptation of technology by teachers, instructional design and display properties in computer software, and administrative and logistic considerations that facilitate access to and use of technology. The approach will involve (1) identifying baseline information pertinent to each key area; (2) designing, developing, and adjusting strategies in school laboratory settings; (3) field testing the prototype strategies in a limited number of school districts around the country; and (4) disseminating findings and products.

MAJOR PRODUCT: Research report.

PROJECT DIRECTOR:

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# ANALYSIS AND DEVELOPMENT OF NATURALISTIC AND EXPERIMENTALLY CONSTRUCTED MICROEDUCATIONAL ENVIRONMENTS FOR MIDLY HANDICAPPED LEARNERS: A FOUR-YEAR PROGRAM OF RESEARCH

TARGET AUDIENCE: Educators of mildly handicapped learners.

AWARD: Grant G00-83-02860 1/01/1983 to 9/30/1987 Cost: $1,000,000

The writers of this application begin by noting that there is a great deal of enthusiasm for modern technology and expectation that microcomputers will be a boon to education, leading to a great deal of pressure on schools to purchase and prominently display them. The narrative then proposes a set of studies designed to test the unspoken assumptions and uncritical enthusiasm for microcomputer technology in special education for mildly handicapped students. Two approaches have been selected for studying effects of microcomputers on mildly handicapped students: 1) Surveying pertinent contextual variables in naturalistic, field-study research, in order to describe the factors that contribute to outcomes for mildly handicapped students using microcomputers. This strategy will lead to a set of predictions from current policy, administrative arrangements, fiscal priorities, and limitations of current instructional practice. 2) Constructing experimental conditions for studying the potential effects of microcomputers under optimal, state-of-the-art conditions without the usual constraints, then specifying what policy arrangements and expenditures would be needed to facilitate the most desireable outcomes. The first strategy will occupy the first year, and the second the remaining three years of the project.

MAJOR PRODUCTS: Research reports and plans.

PROJECT DIRECTOR:

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## COSTS, BENEFITS, AND POTENTIAL APPLICATIONS OF MICROCOMPUTERS AND RELATED SOFTWARE IN MANAGEMENT AND OPERATIONS OF SHELTERED AND TRANSITIONAL INDUSTRIES

TARGET AUDIENCE: Rehabilitation faculty administrators, manufacturers, and researchers.

AWARD: G00-83-00117 7/01/1983 to 6/1985 Cost: $48,960

This project consists of a two-part survey of approximately 3,900 rehabilitation facilities. The questionnaire has two sections, one for current computer users and one for non-users.

Users were asked how they are using computers in administration, production, and rehabilitation services. The most frequently cited uses of computers were for various administrative purposes. The most heavily used was accounting (73%), with bookkeeping and staff payroll functions used by more than 60% of the respondents. The use of spreadsheets and program evaluation packages was least often cited. The data seem to suggest that most facilities which use computers perform a number of administrative functions with them.

Microcomputers appear to be having a sizeable impact on the operations of rehabilitation facilities. There are more than five times as many facilities using microcomputers now than just two years ago and those facilities which are not now using computers, plan to in the near future. Another conclusion is that facilities, both those which do not have computers and those which do, have a need for information on how to use computers, the hardware and software options available, and the costs of such equipment and software. There is also a great need for training in these areas.

The facilities which currently use computers tend to be much larger than those which are not using computers, and have greater resources and a wider variety of services. The use of computers probably provides these larger facilities with a competitive advantage in both business and rehabilitation services they provide.

Programs written by rehabilitation professionals could benefit a large number of other facilities for administrative, production and service functions. Information about such programs, as well as greater details about other aspects of computer uses in facilities, will be obtained in the second phase of this survey.

MAJOR PRODUCTS: A National Directory; A Microprocessor USERS Network; Identification of Needs for Program Application.

PROJECT DIRECTOR:

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# HIGH TECHNOLOGY: A PROGRAM OF WORK

TARGET AUDIENCE: Education personnel (administrators, teachers, counselors, educational researchers), primarily those involved in vocational education

AWARD: Contract #300-83-0176 7/01/1983-12/31/1984
Cost: $817,973

The overall project is focused on high technology skills and related implications for education and economic development. The project is divided into three major components, two of which are related to the use of computers and to computer literacy. These components are:

COMTASK Database--COMTASK is a computerized task inventory of high technology occupations. Through the efforts of COMTASK, occupations affected by today's high technology emphasis will be identified. The outcome of the COMTASK system will be the availability of task analyses via a computerized system for ready access, the capability of rapid update of these task analyses as changes are needed, a handbook which can be used for program improvement activities in schools, and a manual for conducting task analyses for input into COMTASK to help maintain the database.

State-of-the-Art Papers--A series of nine papers will be developed to address high technology and economic issues which are of major concern to education. Of the nine working titles selected for papers to be developed, the following are related to the use of computers and computer literacy:

- At Home And At Work: The Electronic Cottage
- Computer Software for Vocational Education Instruction: An Annotated Review
- Computer Literacy: Keying in on the Right Information

MAJOR PRODUCTS: Manual for Conducting Task Analyses for Input Into
the COMTASK Database COMTASK User's Handbook

State-of-the-Art Papers

PROJECT DIRECTOR:

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# TECHNOLOGICAL UPDATE OF TEACHERS

TARGET AUDIENCE: Vocational education teachers

AWARD: Contract OEC-300-78-0032 2/01/1982-1/15/1983 Cost: $107,878

Promising approaches to technological update of vocational technical teachers by schools, in cooperation with industry, and by universities will be identified. The dimensions of the problem in schools, occupational areas, and in particular technologies also will be identified. Consultants in nine States will submit papers defining the problem in their States at the secondary level; consultants in nine other States will prepare similar papers for the postsecondary level. Information will be summarized and analyzed in a report. Approximately five hundred secondary and postsecondary institutions will submit materials on their approaches to technological update. Promising approaches identified through site visit interviews will be described in a final report.

MAJOR PRODUCT: Final report

PROJECT DIRECTOR:

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## AN ANALYSIS OF MICROCOMPUTER TECHNOLOGY LITERATURE IN VOCATIONAL EDUCATIONA AND THE IMPLICATIONS FOR POLICY AND PLANNING

TARGET AUDIENCE: Vocational education policymakers

AWARD: Contract OEC-300-78-0032 2/01/1982-1/15/1983 Cost: $25,617

The use of microcomputers in vocational education policy and planning will be reviewed. A literature review, phone interviews, and a Delphi pool of experts will be used to collect data. Findings will be published in a final report.

MAJOR PRODUCT: Final report

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## ACCESS TO MICROCOMPUTERS IN LARGE CITY SCHOOL DISTRICTS

TARGET AUDIENCE: Education Policy Makers and Researchers

AWARD: Contract 300-83-0211 7/01/1983 to 13/31/1985 Cost: $30,000

Microcomputers and other computer-based learning technologies are probably no where more potentially important than in large city school districts. But they require resources at a time of Federal cutbacks and when State aid formulas are disproportionately reducing support to large city school districts. In 1982, a study was begun which examined the use of microcomputers in 10 large city school districts.

The preliminary findings based on first year results indicated:

- Three ingredients seem necessary for schools and districts to move ahead in their use of computers: trained teachers, some equipment, curriculum development;
- Districts, in general, lacked explicit district-wide plans;
- In districts that began the use of technology early (pre-1978), the movement was bottom-up spurred by teacher buffs;
- In districts that began the use of technology only recently, more top-down planning was taking place;
- Math programs and coordinators, supported by rigid State policies, dominated most computer-related programs;
- Demand for services far outstrips the immediate ability of most districts;
- While the question of potential discrimination is valid, it may be inappropriate to develop responses based upon districts' current activities. The problem may be addressed as districts expand their activities.

These findings suffer from a major research problem in this area. Their half-life is perhaps six months, at best. Therefore, the study is returning to the same 10 large city school districts in the early winter of 1983 to reexamine its findings in light of an extremely active year on the part of school districts.

MAJOR PRODUCTS: Written reports.

PROJECT DIRECTORS:

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# EDUCATIONAL TECHNOLOGY IN RURAL SCHOOLS

TARGET AUDIENCE: Rural school administrators and teachers

AWARD: Contract P-82-0074-81 10/1983 to 1/1985 Cost: $30,000

Seven case studies will be prepared on instructional uses of small computers in rural school districts. Each case study will describe issues such as the process of adoption of computers, teacher training, details of student and staff experiences with computers, community attitudes, and prospects for future changes in this area of innovation. Sites include communities in Alaska, California, Wisconsin, Texas, North Carolina and New Hampshire. This project will also include an analytic essay, based on the case materials, discussing the generic problems and characteristics of rural education and the potential of small computers to improve opportunities of rural students.

MAJOR PRODUCTS: Commissioned papers.

PROJECT DIRECTOR:

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## NORTHWEST REGIONAL EDUCATIONAL LABORATORY
## COMPUTER TECHNOLOGY PROJECT

TARGET AUDIENCE: School teachers and administrators at the elementary and secondary level who are interested in educational applications of computer technology.

AWARD: Contract 400-83-0005 12/01/81 to 11/30/84 Cost: $700,928

This project flows from an earlier effort that involved the development and national validation of a model for evaluating and disseminating information on K-12 microcomputer courseware. The model MicroSIFT (Microcomputer Software Information for Teachers) includes a process for peer review of available microcomputer courseware, using a network of significant centers of computer users in education. Completed evaluations are mailed to more than 128 Regional Exchanges, State Departments of Education and network sites in 46 States who conduct further dissemination to their constituants. In addition this information plus other data on courseware sources, courseware availability and references to other services is publically available on the RICE (Resources in Computer Education) database that is available for searching on the SPIF (School Practices Information File) of BRS (Bibliographic Retrieval Services) at a nominal cost. Searches can be delimited by machine type, grade level, content area, etc.

During FY-83 and FY-84 the RICE database will be expanded by adding on line searchable files for computer literacy, hardware utilization, and exemplary projects. Courseware evaluations will continue to be coordinated and produced at the rate of 25 programs per quarter. A technology demonstration center has been established to meet the information needs of users concerned with decisions about adoption and use, and connection of computer technology to other educational technologies. The project is also addressing the issue of courseware transportability. Workshops to help in making decisions about technology adoption and use, simulation and training materials are being developed and tested. A series of protocols and demonstration activities is being developed to improve communication among educational agencies. Finally R&D activities are being conducted to determine how cable TV, teletext, view data and similar technologies can be used to improve educational communications and instructional delivery.

MAJOR PRODUCTS:
- The Evaluators Guide, published by the International Council for Computer Education, incorporates the evaluation model, procedures, and instruments for peer review of microcomputer courseware.
- The RICE database, available on the BRS, SPIF.
- Printed copies of computer software evaluations.
- Workshop materials for decision makers will be available in 1984.

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## SCIENCE AND MATHEMATICS SOFTWARE OPPORTUNITIES AND NEEDS

TARGET AUDIENCE: Administrators, teachers, software developers

AWARD: 400-82-0022 10/01/1982 to 9/30/1983 Cost: $95,237

The current state of mathematics and science instruction in U.S. schools is adequate to the needs of a technological society. At the same time there are major developments under way in the form of increasingly powerful microcomputers and sophisticated educational software. To what extent can the opportunities created by computer technology address the needs that are being uncovered in school mathematics and science instruction? In addressing this topic, within the province of mathematics and science instruction, the contractor obtained descriptions of most available software, reviewed many published software evaluations, acquired a broad selection of software, reviewed most grant-supported software development projects, consulted with experts in this area, and interviewed a broad range of teachers, supervisors, school administrators, school support personnel, and software developers.

The pattern that emerges is that while microcomputer software holds great promise, its use in mathematics and science instruction in schools is in its infancy. BASIC programming and drill and practice are the most widespread current uses of the technology. Only modest, scattered instructional improvements can be expected by extrapolating current trends. However, with a major commitment of public and private resources at all levels, substantial improvements are possible in teacher effectiveness and consequent student learning and achievement. To realize these improvements, there must be major efforts to improve teacher training, to develop better software, and to acquire and use appropriate software. Supporting these efforts, there is a need for research on computer-related learning, development of new curricula, increased software evaluation, better dissemination of software information, and response to the equity issues raised by microcomputer use.

MAJOR PRODUCTS:

- Executive Summary Report. Abstract of the Project Final Report. 14 pages. $3
- Project Final Report. Methodology, findings, conclusions, recommendations, bibliography, and a complete listing of math and science software vendors and titles available. 150 pages. $7
- Review of Commercial Science and Mathematics Educational Software. An analysis of types of commercial software available, present trends, and recommendations for the future. 20 pages. $5
- The Electric Software Finder. A description of TERC's on-line database of math and science software and instructions for its use. 55 pages. $12

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# NEEDS AND DEVELOPMENT OPPORTUNITIES FOR EDUCATIONAL COMPUTER SOFTWARE IN READING, WRITING, AND COMMUNICATION SKILLS

TARGET AUDIENCE: Administrators, teachers, software developers.

AWARD: 400-82-0021 10/01/1982 to 9/30/1983 Cost: $106,000

This project goal was to examine the needs and opportunities for reading, writing, and communication software. Rather than carry out a broad evaluation of available courseware, which would duplicate other efforts, the American Institutes for Research staff identified critical problem areas and gathered information necessary to explore potential solutions to them. As background, the project prepared an issue-oriented literature review, the results of which were discussed by a National Advisory Panel of experts in reading, writing, software development, and software publishing. To clarify and explore solutions to the problems identified in the literature review, a series of 17 Idea Work Group meetings were held throughout the United States to examine the barriers to software development in reading and writing skills and, through use of creative problem-solving techniques, to explore solutions for these problems. In addition, AIR contacted over 200 developers and reviewed 12 major software catalogs and the 1981, 1982, and 1983 issues of eight computer magazines and two computer news-weeklies to identify relevant software. The software packages were categorized by reading or writing skill area (using a recent basal reading series), to identify skill areas needing more attention. The staff held private discussions with 40 other software developers, to assess general perceptions about the educational software market and to identify additional problem areas.

The final report gives the results of this study. It details how progress in the areas of reading, writing, and communication courseware will be facilitated by (1) clearer guidelines for the design of good courseware, (2) increasing the incentives for the development of reading, writing, and communications courseware, and (3) increasing the incentives for teachers to seek out and use the courseware. Also included are a large set of useful recommendations for software developers, for schools, and for federal and state policy-makers.

MAJOR PRODUCT: Final report

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|---|---|
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# NEEDS AND DEVELOPMENT OPPORTUNITIES FOR EDUCATIONAL SOFTWARE FOR FOREIGN LANGUAGE INSTRUCTION IN SCHOOLS

TARGET AUDIENCE: Administrators, teachers, software developers

AWARD: 400-82-0023 10/01/1982 to 9/30/1983 Cost; $101,620

The purpose of this project was to seek out and describe the needs and opportunities that teachers and educational agencies perceive for educational software in the field of foreign language instruction.

The search of information sources was heavily concentrated on the microcomputer courseware. From September, 1982 through May, 1983, the project collected and analyzed information. Included in the searches were distributors, publishers, producers of microcomputer courseware, university and college departments using CAI in their language programs, State Education Agencies, State supervisors of foreign languages, language organizations, foreign language teachers and relevant administrators. From available descriptions of courseware it was found that:

- there exist over 500 microcomputer courseware titles for fourteen different languages (including ESL), for nine different microcomputers, using different CAI formats, and for a variety of levels of students.
- most of the identified courseware (30.3%) is for ESL. Among other foreign languages, materials for French are the most prominent followed by those for Spanish and German, in that order.
- most (60.6%) of the identified courseware is for the Apple microcomputer, and only some ESL and Spanish materials is available in an Apple-Corvus shared-memory system.
- most (52.5%) of the courseware is drill and practice.
- most of the courseware (34.4%) is for the intermediate level student.
- most of the courseware is for grammar.
- very little (9.8%) of the courseware has been evaluated or reviewed, and reviews are not of uniformly high quality.
- courseware that is designed to be modifiable by a user costs more than the non-modifiable ("fixed") courseware. Courseware on diskettes is more expensive than on tape. The most expensive packages are in the ESL, Spanish and multilingual categories.
- most courseware is copy protected, requiring the purchase of multiple copies for school use if large numbers of students are to be served by several microcomputers.

MAJOR PRODUCTS:
- Final Report on Needs and Development Opportunities for Courseware for Foreign Language Instruction.
- Survey Report on Available Microcomputer Courseware for Foreign Language Instruction.
- Survey Report on Mainframe Courseware for Foreign Language Instruction.

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# COMPUTER LITERACY FOR VISUALLY IMPAIRED STUDENTS

TARGET AUDIENCE: Visually impaired students, ages 12-21.

AWARD: Grant G00-83-00494 8/01/1983 to 7/31/1984 Cost: $52,595

The purpose of this project is to assess the educational potential of computer hardware and software for blind and low-vision students ages 12-21. The project will bring together the expertise of science and math curriculum developers, math and computer science educators, educators of the visually impaired and staff development personnel to field-test available devices and programs that will give visually impaired students access to computer technology. The assessment will involve subjecting each item to a critical review, based on a specified set of criteria. The result will be a set of technical details, including costs, and recommendations for use, based on the research of the staff, and more importantly, on the results of the field testing with blind and visually impaired students. The resulting data base will serve not only to help educators match computer hardware and software with specific individuals, but will also serve the more fundamental need for a body of information that can raise the awareness of teachers, counselors, and employers who need this information.

MAJOR PRODUCT: Final report.

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## A SYSTEM TO EVALUATE MICROCOMPUTER INSTRUCTIONAL SOFTWARE FOR VOCATIONAL EDUCATION

TARGET AUDIENCE: Vocational educational personnel

AWARD: Contract 300-83-0159 6/01/1983-5/31/1984 Cost: $105,816

The purpose of this project is to design a system for evaluating microcomputer instructional software for vocational education. The specific objectives are:

1. To review the literature about the systems for evaluating microcomputer software for vocational education;
2. To adapt or design a system for evaluating microcomputer software for vocational education;
3. To pilot test the system with at least 10 pieces of instructional software; and
4. To disseminate information about the evaluation system through established National Center for Research on Vocational Education dissemination mechanisms.

The outcome of the project will be a system for evaluating microcomputer instructional software for vocational education. The system will include an evaluation instrument and support system documentation that will be fully described in a final report.

MAJOR PRODUCT: Final report

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# REGION X ADULT EDUCATION SOFTWARE CONSORTIUM

| | | |
|---|---|---|
| TARGET AUDIENCE: | Adult education programs in the States of Alaska, Idaho, Oregon and Washington. | |
| AWARD: | 7/01/1983 to 6/30/1984 | Cost: $6,841 |

The objectives are:

- To obtain and screen microcomputer software appropriate for use with ABE students.
- To disseminate software information within the four-state region.

The consortium, organized in March 1983, has developed a team of 12 experienced Adult Basic Education (ABE) instructors who are skilled in the use of microcomputers. The team, three from each State, will meet twice a year to thoroughly analyze software initially screened by the consortium coordinator. Team members serve as ABE consultants in their own State. The consortium newsletter will provide software reviews and other pertinent information.

The coordinatior will contact software producers/publishers for preview copies, gather public domain basic skills software, conduct an initial analysis, disseminate initial analysis data and preview copies (when available) to the consortium team, and maintain a software clearinghouse.

An evaluation will be conducted by the four State directors of adult education from Alaska, Idaho, Oregon and Washington.

MAJOR PRODUCTS: Periodic newsletter, reviews of basic skills software, regional software clearinghouse.

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## MATERIALS EVALUATION AND STORAGE SYSTEM/REGION X
## SOFTWARE CONSORTIUM

TARGET AUDIENCE: All adult learning centers, adult programs and adult learners.

AWARD: 9/1983 to 6/1984 Cost: $4,400

The project objectives are to receive materials and software from publishing companies and institutions receiving funds for special projects relating to adult education and to organize these into subject areas; to evaluate the materials and disseminate information to State programs, and to store materials at Wenatchee Valley College for use by others.

The purpose is to provide for a functional approach to materials received for use in adult basic education programs, especially reading, writing skills, math, consumer education, citizenship and English as a Second Language. This functional approach would entail organizing, evaluating, disseminating and/or storing the materials to serve all programs, statewide, which use federal funds to provide adult basic education.

The project will evaluate software received for use in adult basic education programs, accumulating good software for demonstration purposes and disseminating information and evaluation to all adult education programs in Region X.

As this service is publicized throughout the Region and is used by adult education departments, it will be evaluated.

MAJOR PRODUCTS: Physical organization and storage of resource materials/software and the evaluation for the State and Region X.

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# COST AND COST EFFECTIVENESS OF EDUCATIONAL INTERVENTIONS

TARGET AUDIENCE: Educational Policymakers

AWARD: Contract NIE-G-83-0003 12/-1/1982 to 11/30/1984 Cost: $109,933

The purpose of this project is to conduct a meta-cost-effectiveness analysis of various educational interventions ranging from peer tutoring to computer-assisted instruction. Later stages of the project will focus explicity on various educational technologies. The final report includes analysis of different types of computer-aided instruction using micro-computers. The project is different from others because it uses meta-analysis as the major research tool, thus it synthesizes the major research in this area in a systematic fashion. The major project activities focus on a combination of data collection and analysis.

MAJOR PRODUCTS: Final Report 11/30/1983

Final Report 11/30/1984

PROJECT DIRECTOR:

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67

## GUIDELINES AND STANDARDS FOR IMPLEMENTING ADVANCED TECHNOLOGY PROGRAMS IN POSTSECONDARY INSTITUTIONS

TARGET AUDIENCE: Postsecondary educators

AWARD: Contract OEC-300-78-0032 2/01/1982-9/30/1982 Cost: $110,098

Prototype sets of standards, guidelines, and program specifications will be developed for computers and two other high technology areas. General procedures also will be developed for use by postsecondary institutions in developing standards and guidelines in other high technology areas. Cost effective approaches will be used.

MAJOR PRODUCTS: Guidelines and Standards

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## WRITTEN COMMUNICATIONS: COORDINATION AND EVALUATION OF VIDEODISCS AND MICROCOMPUTERS (ViM)

TARGET AUDIENCE: Computer educators.

AWARD: Contract #300-81-0314 10/01/1981 to 9/30/1983 Cost: $282,404

In order to determine the impact of the interactive videodisc and microcomputers in elementary schools, 45 participating schools in 15 States were provided with a number of interactive videodiscs, a set of introductory computer programs and games, and electronic equipment to (1) allow the computer to control the videodisc and (2) connect each computer to a national electronic telephone network.

The contractor, American Institutes for Research (AIR), developed and maintained the national electronic mail system and provided software programs for its utilization (ViM-Ware). The National telephone network has been used to exchange computer programs through a process of "uploading" and "downloading" and to exchange information about software and the impact of the technology on school sand students. In addition, AIR developed an authoring program to allow teachers to develop interactive computer control of the videodiscs (Vim-Script) and provided teacher training and consultant assistance to help both students and teachers master computer literacy.

The evaluation component of the project was designed to learn how the computer and the interactive videodiscs perform as instructional aids, to monitor the physical performance of the equipment, and to provide some criterion for measuring the impact of high technology on elementary education.

Equipment used in the project consisted primarily of: Apple II Microcomputer, Discovision OVA Videodisc Player, Novation Applecat Telephone Modern, Allen VMI Videodisc Interface, and Panasonic Color Television Monitor.

MAJOR PRODUCTS:
Vim-Ware -- two software programs to facilitate use of telephone network.
Vim-Script -- interactive videodisc authoring program.
Evaluation report

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# AN EVALUATION OF THE EFFECTIVENESS OF AUTHORING LANGUAGES FOR FACILITATING INTEGRATION OF MICROCOMPUTERS INTO SPECIAL EDUCATION

TARGET AUDIENCE: Special educators.

AWARD: Grant G00-83-00194 5/01/1983 to 4/30/1984 Cost: $49,861

The purpose of this project is to evaluate the utility of "authoring languages," which are pre-formatted programs that are said to allow novice micro-users with no programming experience to write lessons in an authoring mode that their students can work with in the response mode. This study plan proposes to pursue the argument that authoring languages may permit teachers to become familiar with the technology, and more importantly, be productive and generative of new ways of utilizing the microcomputers for instructional work with children in special education settings. A study plan and evaluation process are described. A cost/benefit analysis will help school districts choose from among the available authoring languages in light of their effectiveness when used by teachers and their applications with program writing and student responses to the programs the teachers write.

MAJOR PRODUCTS: Evaluation report

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|---|---|
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## A SYSTEMATIC APPROACH TO COMPUTER-ASSISTED INSTRUCTION IN ABE/GED

TARGET AUDIENCE: Adults who have not completed high school.

AWARD: TEC-14 7/01/1982 to 6/30/1983 COST: $11,550

Computer-assisted instruction has been assessed as an effective means of addressing educational deficiencies of elementary and secondary students. The purpose of this project is to determine if these outcomes can be replicated in meeting needs and interests of adult students. A systematic evaluation will involve a comparison between two classes of ABE/GED students, those receiving computer-aided-instruction and those receiving services within a traditional framework for instruction. Outcomes in terms of academic gains and the time required to achieve those gains will be used to assess the effectiveness and efficiency of this project.

MAJOR PRODUCTS: An evaluation report

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## AEL BASIC SKILLS PROGRAM

TARGET AUDIENCE: Secondary school students in tHe Appalachian Region with deficiencies in basic skills.

AWARD: Contract NIE-G-80-0101 9/01/1981 to 11/30/1984 Cost: $375,000

The purpose of this project is to assess the feasibility of using microcomputers for remediating basic skills deficiencies of secondary school students in the Appalachian Region. The project includes two related scopes of work: (1) conducting an Impact Assessment Study (IAS) where microcomputers are used to deliver instruction and (2) developing Guidelines for Assessing Secondary Remediation Software.

The IAS uses a "field experiment" approach to examine ways in which microcomputers can be used in rural Appalachian high schools to remediate basic skills deficiencies. The major limiting factors of the IAS design structure were local school site constraints. Off-the-shelf commercial software was provided each of eight test sites with local needs and capabilities determing the way in which they would be used. In most cases, students in the experimental groups were assigned for 15-20 minutes per day to work computer programs appropriate to their needs.

The Guidelines for Assessing Secondary Remediation Software consists of a menu-drive microcomputer disk and accompanying documentation. The disk directs software reviewers through an assessment of software in terms of its instructional design. Reviewers may select from the menu one or more conceptuals structures from such curriculum theorists as Bloom, Gagne, and Briggs. After reviewers respond to the questions presented by the computer, a report of the assessment is printed.

MAJOR PRODUCTS:

1) A Practical Guide for Educators, a document explicating the findings of the IAS to inform educators who wish to use microcomputers for remediation of basic skills deficiencies of secondary school students.
2) Guidelines for Assessing Secondary Remediation Software.

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## MICROPROCESSOR TESTING AND TEACHING OF VERB MEANING

TARGET AUDIENCE: Developmentally disabled, physically handicapped and language disordered children at the 2-4 chronological or functional level

AWARD: Grant NIE-G-81-0009 12/1/80 to present Cost: $92,000 for FY 83

The purpose of this project is to develop microcomputer programming and developmental data for the testing and teaching of verb meaning in the above target population where many have communication problems, in both language production and comprehension. Its use would not only expand the child's vocabulary, but provide a focus for new rules of sentence construction. The MicroSALT program provides a Systematic Analysis of Language Transcripts and the Teach Test Talk Program will use up to 25 verbs in up to 100 action scenes.

Other studies will include documentation of developmental change and individual differences in normal children's verb comprehension, "Treatment by Aptitude" studies at different developmental levels, and learning and performance studies of three developmentally disordered populations.

MAJOR PRODUCTS:

- Computer program and documentation for scheduling individualized, experimental testing (Teach/Test/Talk)
- Computer program and documentation for analyzing free speech samples of communication (MicroSALT)
- Technical reports on the development of verb vocabulary

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## USING THE MICROCOMPUTER TO TEACH PROBLEM SOLVING SKILLS

TARGET AUDIENCE: Primary grade children and their mathematics teachers

AWARD: Grant NIE-G-81-0009 12/01/80 to present Cost: $45,000 for FY 83

This research will use microcomputers to establish a direct link between written symbolic number sentences and the informal modeling processes that children use to solve verbal problems. Through appropriate instructional activities we hope to be able to train children to use the microcomputer to generate a number sentence on the computer video display. The computer, in turn, will generate a pictorial representation which will parallel as closely as possible the direct modeling procedures that a child would use. Thus, the generation of the number sentence will produce the means with which the child will be able to solve the problem in a natural way.

The basic research methodology will be the small group teaching experiment combined with individual clinical interviews and observations. The exploratory research work will establish basic techniques and procedures. It will include the development of appropriate computer software, a portion of which is expected to be a modification of existing programs, an initial feasibility study with a small number of children working with a microcomputer (spring through fall 1982), and an initial pilot study (fall, 1982). The second category will comprise a series of controlled teaching experiments with primary grade children (spring and fall 1983).

MAJOR PRODUCTS:

- o Microcomputer Research Instrumentation for Teaching Basic Mathematical Problem Solving Skills
- o Technical Reports - Using the Microcomputer to Teach the "Basic" Computer Language
- o Mathematical Problem Solving Skills

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# RESEARCH ON TECHNOLOGY: A COMPARISON OF THINKING AND PROBLEM SOLVING STRATEGIES OF LEARNING DISABLED AND NON-LEARNING DISABLED STUDENTS USING THE LOGO MICROCOMPUTER PROGRAMMING LANGUAGE

TARGET AUDIENCE: Educators of elementary students with and without learning disabilities

AWARD: Grant #G00-83-00193 1/07/1983 to 3/06/1984 Cost: $37,668

The purpose of this project is to make use of the new technology of microcomputers and of the new program language LOGO. It will compare the thinking and problem-solving strategies of elementary learning disabled and non-learning disabled students in learning to use LOGO to solve a standard set of problems. Research data will be gathered through pre, post and delayed-post interviews of teachers and students, through evaluation of performance on training tasks and on problem solving tasks. Long term use of LOGO and the problem solving tasks will be evaluated.

MAJOR PRODUCTS: Report

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## MATHEMATICS LEARNING

TARGET AUDIENCE: Some of the computer applications described below are designed to aid researchers studying the cognitive processes involved in learning mathematics concepts. A computer module for initial or remedial teaching of elementary school children is also described.

AWARD: Institutional Grant NIE-G-83-0004 12/01/1983-11/30/1984
Cost: $264,384

The Learning Research and Development Center's research program on mathematics learning investigates the development of understanding and skill in mathematics. The theoretical and experimental research funded by the National Institute of Education contributes to a scientific understanding of the main components of mathematical thinking: comprehension of math concepts and structures, and knowledge and ability in computational procedures and problem solving. This work provides a basis for developing computer applications to model cognitive processes and to assist in instructing children in basic mathematical principles. Some of these applications have been developed under funding from other agencies and foundations.

Several cognitive models of conceptual knowledge and learning processes have been designed--e.g., subtracting with borrowing, elementary word problem solving, and problem solving in geometry and algebra. A computer based instructional module for developing a student's understanding of the base-10 numeration system has been designed and field tested. The module simulates manipulation of physical objects, matched in specific ways with symbolic representations, to help children achieve understanding of place value. Each lesson has both an instructional and a practice segment; practice is presented as a game that can be played by one or two children. The module is programmed to run on a Terak 8210A minicomputer.

MAJOR PRODUCTS: Computer instructional module with teachers' guide; computer models of cognitive processes.

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# ADAPTING COMPUTER-BASED INSTRUCTION TO INDIVIDUAL DIFFERENCES

TARGET AUDIENCE: Students from several grade levels will participate in instructional studies. The project's results are intended to benefit all learners from upper elementary school through college.

AWARD: Institutional Grant NIE-G-83-0004 12/01/1982-11/30/1984
Cost: $75,455

This project explores ways in which computer-based tutoring can adapt to individual differences among students in school-subject knowledge and in general aptitudes for learning. Such an instructional system should be able to both test and teach--that is, to continually monitor and evaluate a student's responses during instruction and to adjust its presentation according to the results of its evaluations. The first phase of the project focuses on identifying properties of student-computer interaction that can be the bases for making decisions about student strengths and weaknesses in specific subject-matter knowledge and in general learning skills. In the second phase, these properties will be considered in experimenting with techniques for adaptation that can be built into intelligent tutorial computer systems. Finally, a detailed design will be specified for tutoring components that can illustrate advanced methods for adapting to student needs.

The subject matters and skills used as learning domains in this work are elementary arithmetic and problem solving, reading comprehension, and introductory physics. The computer facilities used are a VAX 11/780 minicomputer and dedicated artificial intelligence computers. Software system facilities are Interlisp-VAX and Interlisp-D with the LOOPS package.

MAJOR PRODUCTS: Set of miniprograms that demonstrate adaptive mechanisms applicable to a variety of computer-based instructional approaches.

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## DEMANDS AND COGNITIVE CONSEQUENCES OF COMPUTER LEARNING

TARGET AUDIENCE: Elementary and secondary teachers, state and local coordinators of school technology programs, cognitive science and educational researchers, consumer developers and teachers of computer science.

AWARD: Contract NIE-400-83-0017 1/10/1983 to 1/09/1985
Cost: $299,684

Many claims have been made about the benefits of computer related instruction. This project examines certain of those claims by addressing major aspects of the educational uses of computers. One series of studies focuses on the cognitive demands and consequences of computer programming in BASIC, the language most often taught in schools and most often available in microcomputers. A second series of studies examines the cognitive consequences of activities that employ educational games and simulations.

Studies in both series will compare learners of different ages, socioeconomic backgrounds, genders, school achievement levels, and prior computer experience on a range of performance tests and cognitive measures. To determine whether learners with different aptitude and ability patterns require more or less structure to profit from computer-based learning experiences, half of the students will receive regular instruction and half will be given more explicit assistance which highlights the cognitive components of the tasks they attempt. The two series of studies should provide insight about which method of instruction works best with different types of students, and which intellectual skills, cognitive styles, and attitudes are influenced by computer learning.

MAJOR PRODUCTS: Reports for school personnel and other technical reports for researchers.

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## THE DEMANDS AND COGNITIVE CONSEQUENCES OF LEARNING TO PROGRAM

TARGET AUDIENCE: Elementary and secondary teachers of computer science, State and local coordinators of school technology programs and cognitive science and educational researchers.

AWARD: Contract NIE 401-83-0016 1/10/1983 to 1/09/1985
Cost: $286,795

Rhetoric about the benefits of computer programing is becoming ever more prevalent. Although the claims for the cognitive value of programming are broadening both in scope and in public awareness, the evidence in support of such claims is meager at best. Such claims, however, affect important decisions in public education. It is critical for decisionmakers in education to know what may be required to obtain such outcomes, and what the relationship is between the cognitive demands of programming and the cognitive outcomes.

This is an investigation of the knowledge and capacities relevant to computer programming, the ability to "transfer in" relevant knowledge and capacities to the learning of programming, and the ability to "transfer out" generalizable knowledge and capacities applicable to the learning of programming.

The cognitive demands which "learning to program" places on the learner will depend on what one considers the meaning of "learning to program" to be. Therefore, in the first year the design of the research will consist of a series of exploratory studies which will examine from different perspectives what it means to have expertise in programming and what levels of expertise are reasonable to expect from children. We will select adult and child programming experts as will as programming novices to study. Subjects will be interviewed, observed while programming, and presented with a battery of existing and to-be-developed measures to assess basic cognitive skills, programming expertise and transfer of programming skills to non-programming domains.

In the second year a refined battery of measures will be used to study in detail how children in several classrooms learn to program over the course of the school year. This longitudinal study will combine pre-and post-assessments using "demand" tasks, programming expertise tasks and transfer tasks as well as careful observation and process analysis during the course of the school year.

This two-year study should yield increased understanding about the nature of the programming and instructional environments which contribute to children learning to program, as well as which cognitive characteristics are most likely to contribute to children profitting from learning to program.

MAJOR PRODUCTS: Reports for school personnel and the general public and technical research reports.

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## GROUPCOM: A COMPUTER PROGRAM FOR INVESTIGATING SOCIAL PROCESSES IN SMALL GROUPS

TARGET AUDIENCE: Researchers investigating social processes in small groups

AWARD: Institutional Grant NIE-G-83-0004 12/1/1982-11/30/1984
Cost: $128,000

The Learning Research and Development Center's research program on the social context of learning studies influences of school group interactions, family, and community on a child's learning progress. One of the projects in this program has developed a flexible computer program for conducting on-line social psychological studies. Using CRT terminals, two to six subjects can communicate with one another, or one to six subjects can "communicate" with one another, one to six subjects can "communicate" with one to nine simulated others. In the latter case, the simulated information received by each subject can be independently manipulated. The experimenter has control over several features of the experimental trials, including response order, response type, method of response collection, and display format. The program can be used to investigate phenomena such as conformity, reaction to deviance, social comparison of abilities, group decision making, impression management, and leadership. GROUPCOM is programmed to run on a VAX 11/780 minicomputer. A computer tape and documentation are now being prepared and will be available from the project director.

MAJOR PRODUCTS: Group communication program package and a published report: Levine, J., & Stein, H. (1978). GROUPCOM: A computer program for investigating social processes in small groups. Behavior Research Methods and Instrumentation, 10(2), 191-195.

PROJECT DIRECTOR:

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# NEUROPSYCHOLOGY ASSESSMENT AND TRAINING OF READING CAI FOR LD STUDENTS

TARGET AUDIENCE: Researchers of learning disabilities.

AWARD: Grant 1/01/1984 to 12/31/1985 Cost: $344,100

This is a project in the area of what is currently called clinical neuropsychology. By this ordinarily meant deriving theories of cortical function from studying patients with demonstrable damage to one or another area of the brain, then applying these theories to others who share similar patterns of psychological test results. Much of the writing in this area is about what functions seem to be mediated by the left hemisphere as compared with the right. The earliest findings about localization of function cam from patients with damage to certain areas of the left parietal lobe that affect various aspects of language and speech. These findings, coupled with some thinking about the nature of language, has led to a conceptualization of the left hemisphere as associated with sequential-analytic processing of information, and the right with simultaneous-holistic processing, a conceptualization which is usually attributed, with varying degrees of justification, to the great Soviet psychologist and neurophysiologist, A.L. Luria.

MAJOR PRODUCTS: Research report.

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# ERIC CLEARINGHOUSE ON INFORMATION RESOURCES

TARGET AUDIENCE: The intended audiences for such information are researchers, practitioners--teachers, administrators, etc. and anyone interested in information resources and educational technology.

AWARD: Contract NIE-400-82-0004 3/01/1982 to 12/31/1984
Cost: $622,158

The Educational Resources Information Center (ERIC) Clearinghouse on Information Resources at Syracuse University is one of 16 ERIC clearinghouses designed to provide users with ready access to primarily English-language literature dealing with education. ERIC provides information to its users through a variety of products, data bases, abstract journals, microfiche, computer searches, on-line access, document reproductions, analyses and synthesis, etc.

The ERIC Clearinghouse on Information Resources focuses on personnel, personnel development, systems procedures, materials, and equipment in the fields of library and information science and educational technology. Among the areas covered in educational technology, in a general sense are those of instructional development, encompassing needs assessment, instructional objectives, criterion referenced testing, etc., and technological delivery systems, television, cable, ITFS, broadcast, satellite, etc., computers (CAI, CMI, data) and "humble media" (film, slides, graphics, overhead transparancies, etc.)

In the computer area the clearinghouse has accessioned for the ERIC system a myriad of information on computer applications in education, especially in the areas of instruction, instructional management and educational data.

MAJOR PRODUCT: ERIC Digests (short two page syntheses) on computer literacy and microcomputers; Information Analysis Products focusing on computer assisted instruction, computer-based education, and a primer on microcomputers; and various searches of the ERIC database centering on microcomputer and computer applications in education.

The clearinghouse also produces a series of microcomputer diskettes (currently only usable on Apple microcomputers) containing information on "hot" topics in educational technology and information sciences.

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## NATIONAL DATABASE OF INTERACTIVE TECHNOLOGY APPLICATIONS IN EDUCATIONAL SETTINGS

TARGET AUDIFNCE: National education community

AWARD: Grant G0083-02724 8/01/1983-6/30/1985 Costs: $313,085

The Monroe C. Gutman Library will establish a national database on the uses of information technology in education. This project builds on the Library's leadership in conducting conferences on technology in education, and on its pioneering publication in 1981 and 1982 of a directory on microcomputer use in educational institutions. While our first directory had 276 entries, and the continuing importance of such data is clear from the hundreds of inquiries the Library receives in response to these publications. These inquiries suggest a need for data on uses of other technologies.

The proposed database will be available online through an accessible national computer vendor--Bibliographic Retrieval Services, Inc. It will also be available in disk form. and through publication of print directories for specialized audiences. In the first year we will expand and update the information on microcomputers through a variety of queries. In the second year we will expand to other technologies and establish procedures for an annual updating. The online database will be pilot tested in a dozen institutions and agencies. Project evaluation will incorporate the experience of the test sites and users of the disk and publications. An advisory board will guide the project, which will conclude with a national conference for publicizing the availability and uses of the database, and for dissemination of preliminary analyses of trends in the data. Fees from the use of the computer database and sale of the disk and directories will make the service self-sustaining after two years of Fund support.

MAJOR PRODUCT: A 1983 Directory on Microcomputer Use in Educational Institutions

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# A RESOURCE CENTER FOR THE STIMULATION OF POST SECONDARY EDUCATION INNOVATION VIA COMPUTER NETWORKING

TARGET AUDIENCE: College faculty and administrators.

AWARD: Grant G00-83-02812 9/01/1983 to 8/31/1986 Cost: $229,028

The project seeks to make readily accessible to postsecondary institutions information from many funding agencies on currently funded educational projects. This will be carried out using the Electronic Information Exchange System (EIES) at the New Jersey Institute of Technology as a computer communications and conference system which can be accessed via TELENET, UNINET or WATS lines. The EIES system, which has been under continuous development since 1975 when it was first funded by a grant from the National Science Foundation, has been thoroughly tested and has the capability of implementing an on-line data base.

The system will be designed not only to provide information on current educational grants, but also to provide on-line consultation via the EIERS system and to make available computer conferences on topics identified as being of keen interest to our community of users. Once software has been designed and implemented, two years of trial usage of the system will be carried out by geographically dispersed and diverse communities of college and university faculty and administrators.

Evaluation will be an integral and important part of this program. Since the system allows the evaluator to be on-line continuously, she also will be able to participate in the planning and implementation of all phases of the program.

A non-profit corporation, the College and University Resource Institute, will carry on this project beyond the grant period.

MAJOR PRODUCT: Computerized educational resources directory.

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# ELECTRONIC TELECOMMUNICATION SYSTEM

TARGET AUDIENCE: Federal, State, and local adult and vocational education personnel

AWARD: Contract 300-83-0159 6/01/1983-5/15/1984 Cost: $106,787

The objective of this project is to design and field test a national electronic telecommunications system for use by Federal, State, and local vocational and adult education personnel. It will be used by vocational education improvement agencies across the nation to improve the quality and quantity of their communications and to increase the use of telecommunications technology. The specific objectives include:

1. Evaluate existing data provided by Office of Vocational and Adult Education which indicate the need for such a system.
2. Examine existing telecommunication vendor capabilities.
3. Implement and field test an electronic communication system selected by OVAE for vocational education.
4. Prepare and integrate alternative plans for its continued operation.
5. Promote wide interest in its use and application.

The final technical report will delineate the process employed to identify communication needs, evaluate potential vendors, and describe the procedures to operate the system. It will provide vocational and adult education personnel with information about the processes and technologies needed to use today's telecommunications facilities.

MAJOR PRODUCT: Final report: National Electronic Telecommunications System for Vocational and Adult Education Personnel

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## PROJECT ENLIST (EDUCATIONAL NETWORK LINKING INSTITUTIONS, STUDENTS AND TECHNOLOGY)

TARGET AUDIENCE: Rural adult learners

AWARD: Grant G0082-01463 8/01/1982-7/31/1984 Cost: $154,693

This proposal calls for two existing consortia, representing 15 postsecondary educational institutions, to develop and implement a cost-effective, coordinated network of outreach services for rural adult learners in western Minnesota. An important task for the network will be to help network participants use their collective computer resources to best educational advantage. These network services will be linked with three local community-based educational structures--community education, libraries and telecommunications providers.

MAJOR PRODUCT: A final report documenting this network will serve as a model for others.

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|---|---|
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# NATIONAL RURAL INDEPENDENT LIVING NETWORK

TARGET AUDIENCE: Disabled persons of all ages; community volunteer service providers.

AWARD: Grant G00-83-00149 3/01/1983 to 2/28/1986 Cost: $600,000

The National Rural Independent Living Network is a community information and service delivery system staffed by volunteers. It will develop a network of rural communities and sharing systems to encourage use of knowledge in rehabilitation. Volunteer groups and organizations will include social clubs, libraries, ministerial associations, etc.

This Network will give community core groups Apple IIe microcomputers to use in matching volunteered services with the needs of handicapped persons in the fifteen rural towns where the system will operate. A major feature of the project also is to provide computer communications and electronic mail to obtain information about rehabilitation from data bases, to send inquiries to the main office in Murray State University and to communicate with other sites. It will use the rural bulletin board of Special Net.

This project is important because it builds community based networks that will continue after the project ends and it opens up rural areas to communication with the "outside world." Only through the use of computers to handle the resource matching system could such a project operate on a volunteer basis, since otherwise the workload would be too great.

The project facilitates the dissemination of information and provision of services to rural disabled persons.

MAJOR PRODUCTS: Computer software for the resource matching system; volunteer and needs registration forms; central core handbooks.

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287

## NATIONAL REHABILITATION INFORMATION CENTER (NARIC)
## ABLEDATA INFORMATION SYSTEM

TARGET AUDIENCE: Rehabilitation professionals

AWARD: Contract #300-84-007 11/01/1983 to 10/31/1986
Cost: $2.4 million

NARIC is a national information service providing acces to two, databases: (1) REHABDATA, a file on NIHR- and RSA-funded research, selected journal articles, reports, and other literature in the rehabilitation field; and (2) ABLEDATA, a file on assistive devices for disabled persons. Searches of both databases may be ordered from NARIC; information from ABLEDATA may also be obtained from a network of information brokers, discussed below. NARIC also provides copies of all non-copyrighted documents in REHABDATA and develops and makes available Rehabilitation Research Reviews, state-of-the-art discussions on key topics accompanied by annotated bibliographies.

One of ABLEDATA services is to provide training to rehabilitation professionals who want to become ABLEDATA information brokers. Brokers perform on-line searches of the ABLEDATA file for the client groups they serve. Many brokers maintain lists of local equipment distributors, repair services, and other local resources. A maximum of 21 information brokers are trained each year by ABLEDATA staff. In addition, during the first contract year, ABLEDATA will manage a demonstration project to train up to 15 additional brokers and to provide them with free outline search time.

ABLEDATA brokers must have access to a computer terminal by means of which they are able to search the ABLEDATA file, which is stored on the database vendor's equipment (Bibliographic Retreival Services, Latham, New York). ABLEDATA training is conducted at workshops explaining the database, its thesaurus of descriptors, effective search techniques, and development and maintenance of personal resource files. Hands-on experience searching the file is a key part of training.

Participants in information broker training receive copies of the ABLEDATA Thesaurus and Training Manual.

MAJOR PRODUCT: ABLEDATA Thesaurus, available from NARIC.

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# V. MULTI-PURPOSE COMPUTER EDUCATION PROJECTS

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# ALMA TECHNOLOGY LIGHTHOUSE PROJECT

TARGET AUDIENCE: Educators, administrators, and decision-makers

AWARD: Grant G008301573 11/1/83 to 10/31/87 COST: $21,319 (first year)

The Alma Lighthouse Project offers educators assistance in implementing various applications of computer technology in their schools. The Lighthouse demonstrates microcomputer applications in three major areas: administrative, teaching about computers, and teaching with computers. Demonstrated administrative tasks aided by the microcomputer include fiscal accounting, inventory, student scheduling, student attendence, grade reporting, school elections, athletic scoring, occupational awareness and inter-agency communications. The high school has three programs that teach about the computer. Required for all ninth graders is the validated Computer Literacy Program. The other two semester programs are electives and involve programming (Computer Science I) and advanced programming (Computer Science II). Computers are used to teach subject matter through drill and practice, remediation, problem solving and enrichment. These activities are conducted at every grade level in every subject area using a wide variety of software and many different approaches.

Visitors are welcome to Alma to informally view in general the applications in use or to view some specific application. Formal workshops in Alma provide for a general overview of microcomputer in education, observation of educational computing taking place, understanding of the appropriate role of the computer in education, and planning for implementation. The Lighthouse has available for distribution a variety of software and printed materials.

MAJOR PRODUCTS: The Lighthouse Project offers educators and decision-makers from around the nation programs for observation, discussion and training to assist these individuals in planning, designing and implementing computer technology programs. The project is prepared to tailor demonstration workshops to the specific interests of participants, provide consultation and training, refer participants to other resources and follow-up on concerns raised.

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## ASBURY PARK TECHNOLOGY LIGHTHOUSE PROJECT

TARGET AUDIENCE: Educators, administrators, and decision-makers.

AWARD: G008201707 9/1/82 to 8/31/86 COST: $64,050 (two years)

The Asbury Park Lighthouse Project is prepared to help schools with a variety of concerns directed toward educational computer applications. The Lighthouse offers demonstration, technical assistance and training on several types of administrative and instructional computer applications. The Asbury Park School District is well established as a service provider in the area of computer applications. The District Computer Center serves 70 districts, several municipalities and the State Department of Education as regular clients. The Computer Center sells time-sharing services for instruction and provides data services for a fee. Lighthouse staff, school personnel and Computer Center staff assist other educators in making decisions about computer applications.

In addition to the validated program focusing on secondary mathematics, the Lighthouse demonstrates a middle school mathematics laboratory, instruction in programming, robotics, magnet elementary school and many administrative/ management applications. Visitors see several school sites, a comprehensive Computer Center and associated facilities. The majority of the Lighthouse Project's software has been locally developed and is available in different versions to accomodate use on various hardware systems. Equipment demonstrated includes main frame, mini and microcomputers as well as associated peripheral devices.

Many of the Asbury Park Lighthouse Project's classroom applications are available for both Apple II and TRS-80 computers. Copies of the instructional and administrative software are available to those attending workshops. Structured and informal demonstration programs are offered.

MAJOR PRODUCTS: Lighthouse Project offers educators and decision-makers from around the nation programs for observation, discussion and training to assist these individuals in planning, designing and implementing computer technology programs. The Project is prepared to tailor demonstration workshops to the specific interests of participants, provide consultation and training, refer participants to other resources and follow-up on concerns raised.

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# CALIFORNIA TECHNOLOGY LIGHTHOUSE PROJECT

TARGET AUDIENCE: Educators, administrators, and decision-makers.

AWARD: G008301532 11/1/83 to 10/31/87 COST: $30,181 (first year)

The leadership role of California in technology, coupled with the unique demonstration and delivery system of the Teacher Education and Computer Centers (TECCs) stimulated the creation of a "lighthouse without walls." The California Lighthouse Project builds the capacity of the California Teacher Education and Computer Centers (TECCs) by providing training in the validated NDN exemplary technology projects, while at the same time assisting educators outside California to benefit from the California experience.

The California Lighthouse Project will be establishing turnkey training/certified trainers of selected NDN technology projects at identified TECCs; disseminating TECC case studies to interested educators; coordinating out-of-state visitors to TECCs and preparing orientation material; conducting seminars on technology/policy-related issues; providing JDRP orientation for California funded, exemplary technology projects; and providing selected training and field testing of the interactive video disc.

MAJOR PRODUCTS: Lighthouse Project offers educators and decision-makers from around the nation programs for observation, discussion and training to assist these individuals in planning, designing and implementing computer technology programs.

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## CAM TECHNOLOGY LIGHTHOUSE PROJECT

TARGET AUDIENCE: Educators, administrators, and decision-makers.

AWARD: G008202194 9/1/82 to 8/31/86 COST: $59,546 (two years)

The CAM Lighthouse Project provides schools with state-of-the-art experiences in a wide variety of educational computer applications. This Lighthouse Project demonstrates and provides training on applications of computers for the systematic management of instructional processes, key administrative uses and classroom instruction covering many content areas and levels. A staff of six professional educators are prepared to offer assistance to other educators seeking help from the Lighthouse Project. A unique feature of the Lighthouse is the emphasis on the management of instruction. The Evaluation Center has developed and operates a computer-based instructional management system that provides relevant data to teachers and students after each test taken on CAM objectives.

Beyond demonstration of the computer appplications of the CAM validated program, the Lighthouse Project offers many other useful computer applications. The user has a choice of a group-paced CAM version, an individualized version, or the newest version called Mastery Management; all of which run on Apple II computers. ASSIST is another software system developed by CAM for special education tracking and management. There is extensive locally developed software for general administrative uses and a variety of instructional applications. CAM also developes software in cooperation with local computer firms and with educational computer consortia such as the statewide Minnesota Educational Computer Consortium (MECC) and Minneapolis area Total Information for Educational Systems (TIES). The interactive-videodisc and other innovative technologies are also demonstrated at the CAM Lighthouse.

The majority of CAM computer applications are designed for use on microcomputers. Local CAM schools use Apple II computers for most purposes. The CAM Lighthouse Project offices maintain documentation on most software programs and locally developed software is available to visitors.

MAJOR PRODUCTS: Lighthouse Project offers educators and decision-makers from around the nation programs for observation, dicscussion and training to assist these individuals in planning, designing and implementing computer technology programs. Structured two-day demonstration workshops are offered frequently as well as tailor-made workshops.

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# COFFEE TECHNOLOGY LIGHTHOUSE PROJECT

TARGET AUDIENCE: Educators, administrators, and decision-makers.

AWARD: G008201709    9/1/82 to 8/31/86    COST: $72,742 (two years)

The COFFEE Lighthouse Project offers assistance to educators implementing various applications of technology in schools. This Lighthouse provides demonstrations of the use of computers for instruction, occupational training, and administrative management. Interested persons can obtain information and training on a variety of computer applications to the learning process. COFFEE employs a wide range of computer hardware (mini and microcomputer) and interfaces. An experienced group of professionals from COFFEE, participating schools and cooperating industries are prepared to help educators learn about and make decisions concerning the use of computers in education.

The COFFEE validated program provides training for secondary school-age students in five diversed occupational areas that integrate and/or utilize computer technology. In addition to the validated program, COFFEE features several administrative and classroom applications. A large volume of computer software for various types of computers and applications is demonstrated and is available to visitors. A computer technology resource library contains locally and commercially developed software; periodicals and Journals; instructional/classroom textbooks; and curriculum guides. Software modifications are available for operation on a wide variety of hardware systems. The COFFEE Lighthouse will assist School Districts in conducting high technology needs assessments from kindergarten through adult education. The following are examples of the demonstration workshops offered by the COFFEE Lighthouse staff:

- occupational education in high technology
- teacher education in computer technology
- computer-assisted instruction
- mobile computer laboratories
- interactive videodiscs
- hardware and software evaluation
- adult and community education in high technology
- computer technology programs for the gifted and talented student
- computer literacy programs
- computers as administrative and management tools
- industry/education initiatives

MAJOR PRODUCTS: Lighthouse Project offers educators and decision-makers from around the nation programs for observation, discussion and training to assist these individuals in planning, designing and implementing computer technology programs. The Project is prepared to tailor demonstration workshops to the specific interests of participants, provide consultation and training, refer participants to other resources and follow-up on concerns raised.

PROJECT DIRECTOR:

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# CUE TECHNOLOGY LIGHTHOUSE PROJECT

TARGET AUDIENCE: Educators, administrators, and decision-makers

AWARD: Grant G008301139 11/1/83 to 10/31/87 COST: $32,003 (first year)

The CUE Lighthouse Project is designed to provide educators with the opportunity to participate in hands-on experience in a variety of microcomputer related activities. The Lighthouse highlights workshops on computer-assisted and computer-managed instruction in compensatory education programs. Specific program elements and computer applications available include:

- Microcomputer operation in the compensatory classroom
- Advanced microcomputer operation in the compensatory classroom
- Correlating of local and state curricula with existing software
- Use of commercial software in the compensatory classroom
- Developing software for the compensatory program
- Computer management of student information.

MAJOR PRODUCTS: The Lighthouse Project offers educators and decision-makers programs of observation, discussion and training to assist these individuals in planning, designing and implementing computer technology programs. The Project is prepared to tailor demonstration workshops to the specific interests of participants, provide consultation and training, refer participants to other resources and follow-up on concerns raised. Workshops will run from one to three days depending on the needs of the participants.

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# HOSTS TECHNOLOGY LIGHTHOUSE PROJECT

TARGET AUDIENCE: Educators, administrators, and decision makers.

AWARD: G008001759    6/9/83 to 5/11/84    COST: NONE

The Vancouver School District and the nationally validated HOST Reading and Math Programs offer assistance to educators implementing various microcomputer applications in schools. The Vancouver School District has moved on a steady course to develop its long-range goal to take full advantage of computer technology in a wide variety of educational applications and will provide demonstrations of the following applications:

- Mainframe accounting, administration and management
- Computer-assisted instruction and literacy programs (electronics, physics, chemistry, math, music, word processing, gifted program, summer computer camps, telecommunications)
- Cooperative programs in the establishment of community cable vision, high technology training in math and science and alternative education programs
- Mastery learning programs (HOSTS Reading, Math, Model Schools)
- Community involvement and use of volunteers (task forces, advisory committees, parent awareness sessions, parent computer literacy classes)
- Private sector involvement (school-business partnerships, funding grants, high technology advice and direction, business management workshops, joint business/school in-service programs)
- Teacher training in computer literacy
- Interactive videodiscs

MAJOR PRODUCTS: Lighthouse Project offers educators and decision-makers from around the nation programs for observation, discussion and training to assist these individuals in planning, designing and implementing computer technology programs. The Project is prepared to tailor demonstration workshops to the specific interests of participants, provide consultation and training, refer participants to other resources and follow-up on concerns raised.

PROJECT DIRECTOR:

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## MERRIMACK EDUCATION CENTER TECHNOLOGY LIGHTHOUSE PROJECT

TARGET AUDIENCE: Educators, administrators and decision-makers.

AWARD: G008201708 9/1/82 -8/31/86 COST: $81,944 (two-years)

The Merrimack Education Center Lighthouse Project provides schools with interactive technology and training to assist in accomplishing instructional goals. The Lighthouse Project provides computer application assistance to schools through demonstration at its Computer Learning Center and through the implementation of field based programs. A staff of five professional educators is available to provide technical assistance in introducing successful computer applications in schools. The Lighthouse Project has four main components (1) Computer Assisted Instruction (CAI), (2) School System Computer Support, (3) Computer Training and (4) Computer Software Exchange Library.

The Lighthouse has produced materials and training programs that support its validated CAI programs. This courseware is demonstrated in 16 nearby schools and at the central Computer Learning Center. The School System Computer Support Division provides planning assistance to school districts for the implementation of computer technology within their schools. This support defines requirements through the development of program specifications. Support to schools is provided in both administrative and instructional applications of technology through Center and field based training. The Computer Training component provides training for school system personnel in a variety of areas of computer literacy and computer science education. These programs are offered at the Computer Learning Center and also are delivered with graduate credit for field based training.

School districts participate in the development, exchange and preview of both public and commercial software for application in the educational process. Software is available to visitors and can be previewed at the Computer Learning Center. School districts are encouraged to share locally developed software through the Software Exchange Library.

MAJOR PRODUCTS: The Lighthouse Project offers educators and decision-makers programs of observation, discussion and training to assist these individuals in planning, designing and implementing computer technology programs. The Project is prepared to tailor demonstration workshops to the specific interests of participants, provide consultation and training, refer participants to other resources and follow-up on concerns raised.

PROJECT DIRECTOR:

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## READ:S TECHNOLOGY LIGHTHOUSE PROJECT

TARGET AUDIENCE: Educators, administrators, and decision-makers.

AWARD: G008301129      11/1/83 to 10/31/87  COST: $35,000 (first year)

The READ:S Technology Lighthouse Project offers assistance in a variety of microcomputer applications to educators interested in the goal of computer competency. In addition to the validated READ:S project, the Lighthouse Project offers demonstrations of numerous, low budget, highly successful microcomputer applications currently in place in the Couer d'Alene Public Schools including programming skills, word processing, special education, adult education, career education, drop-out prevention, elementary classroom usage, teacher-training and summer school curricula.

One-hundred thirty TRS-80, Apple II E, and Psychotechnic 360 microcomputers are currently being used within the Couer d' Alene elementary and secondary schools. The READ:S Lighthouse has a library containing the validated project's software, commercial software, locally developed software, and MECC produced software.

The Couer d'Alene Public Schools have been a demonstration site for the *Science of Teaching* teacher in-service model for six years and the READ:S Lighthouse Project is *Science of Teaching* based.

Provision are made during visitations to the READ:S Lighthouse Project for meaningful discussions with local personnel on a "best-match" basis for ideas exchange, problem resolution, planning, and economy of operation for microcomputer applications.

MAJOR PRODUCTS: Lighthouse Project offers educators and decision-makers from around the nation programs for observation, discussion and training to assist these individuals in planning, designing and implementing computer technology programs. The Project is prepared to tailor demonstration workshops to the specific interests of participants, provide consultation and training, refer participants to other resources and follow up on concerns raised.

PROJECT DIRECTOR:

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## ESTABLISHING MICROCOMPUTERIZED LEARNING CENTER

TARGET AUDIENCE: College students at all levels

AWARD: G00-82-02916 10/01/1982 to 9/30/1985 Cost: $132,976

This activity was designed to establish a network of three microcomputerized learning centers at Fayetteville State University. These centers purport to develop or improve service delivery strategies or subject matter content offerings in the following areas which are also developmental activities within the Title III project at FSU: curriculum development in the disciplines of natural science, business and economics, office administration and work processing, social and behavioral sciences and general studies; and student services development. The establishment of the centers, including acquisition of equipment, installation, testing and debugging is a one-year activity. However, this one-year effort will serve as the foundation for the aforementioned continuing developmental activities throughout the life of the grant (5 years). These activities are planned to develop a wide variety of instructional applications to be used in these centers including computer assisted instruction (CAI), remediation, and how to use microcomputers as a word processor for secretarial work. In addition to the instructional applications, the centers will develop and implement a computerized academic advising system, a computerized testing program, and a career planning and placement program utilizing computer technology and audio visual materials. These activities will be developing CAI materials which are not commercially available. Faculty training is also funded in the areas of microcomputer operations and developing CAI modules.

Each center will have a system consisting of disk drives, printers, a hard copy terminal, host microcomputer and several small microcomputers. Each center will also have two microcomputers to be used by faculty and staff for word processing and program development and a communication line from the university computing center. Communication between the microcomputer systems and the computer center will be through the use of an acoustic coupler in each center. Video cassette recorders will be available in each center for backup purposes.

MAJOR PRODUCTS: CAI modules
Software
Faculty expertise

PROJECT DIRECTOR:

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# RECIPE TECHNOLOGY LIGHTHOUSE PROJECT

TARGET AUDIENCE: Educators, administrators, and decision-makers.

AWARD: G008301159  11/1/83-10/31/87  COST: $35,000 (first year)

The RECIPE Lighthouse Project provides schools with state-of-the-art experiences in a wide variety of computer applications. The Lighthouse provides demonstration of, and the appropriate awareness and training for, utilization of microcomputers in a variety of settings and programs including the validated Project RECIPE and COMPUTERONICS. Project CAISH (Computer Assisted Instruction and Support for the Handicapped) is a program involving teacher and student computer literacy, adoptive hardware configurations, CAI, and courseware evaluations and adaptations for special needs. Through the Materials and Media Management System, materials and media services are tracked for a four-county area service region. The FDLRS Microcomputer Centers offers teacher training, courseware reviews and evaluation, and a courseware library. The Media and Instructional Service Center offers computerized media management, a software/courseware Evaluation Center, catalog card/label printing, T.V. graphics generator, textbook and material ordering and inventory, computer literacy courses, interactive videodisc demonstrations, a research Data-Base and a courseware collection. A Data Processing Center handles administrative and students' reporting systems.

MAJOR PRODUCTS: Lighthouse Project offers educators and decision-makers from around the nation programs for observation, discussion and training to assist these individuals in planning, designing and implementing computer technology programs. The Project is prepared to tailor demonstration workshops to the specific interests of participants, provide consultation and training, refer participants to other resources and follow up on concerns raised.

PROJECT DIRECTOR:

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# RESEARCH DEVELOPMENT DISSEMINATION AND EVALUATION ACTIVITY--TECHNOLOGY INITIATIVE

TARGET AUDIENCE: School systems in seven-state region served by McREL (CO, KS, MS, NEB, ND, SD, WY)

AWARD: Contract 400-83-0004 12/1982-12/1984 Cost $113,083 - FY 83 $100,416 - FY 84

The McREL Technology Initiative includes two demonstration sites: the Mapleton School District outside of Denver, Colorado, and the North Dakota State Department of Education. In the school district Apple IIs and Epson microcomputers are being used to process diagnostic data, train teachers and to develop applications in various subject areas. In North Dakota, Epsons and Apple IIs are being used to facilitate meetings and assist with planning and setting priorities.

MAJOR PRODUCTS: Expected products include software developed by project participants, and time task charts and planning and priority setting software.

The Winter 1982 issue of McRELs quarterly publication entitled "Noteworthy" is focussed on school improvement and technology.

| PROJECT DIRECTOR: | ED. DEPT. CONTACT PERSON: |
|---|---|
| Jean Brownlee-Conyers<br>McREL<br>2600 South Parker Road<br>Auroria, Colorado 80014<br>(303) 337-0990 | Susan Talley<br>National Institute of Education<br>Program on Dissemination and Improvement of Practice<br>1200 19th Street, N.W.<br>Washington, D.C. 20208<br>(202) 254-5654 |

302

## A MICROCOMPUTER BASED SPECIAL TEACHER EDUCATION AND EVALUATION LABORATORY

TARGET AUDIENCE: University students enrolled in special education training programs

AWARD: Grant G00-83-01778 7/01/1983 to 5/31/1986 Cost: $321,240

The purpose of this project is to develop and implement a microcomputer-based Special Teacher Education and Evaluation Laboratory (STEEL) at Indiana University. The project will capitalize upon 14 years of research and development that has occurred at the Center for Innovation in Teaching the Handicapped (CITH). The STEEL will provide four major services: 1) discrimination training on special education instructional and behavior management methods using a microcomputer videotape interface system; 2) microcomputer hardware and software for real-time observation, coding, storage and summarization of classroom performance of preservice teachers; 3) training in computer literacy for special educators, and 4) development of a computer-based information management system to enhance the quality control of the undergraduate and master's degree preservice training programs at Indiana University.

MAJOR PRODUCTS: Microcomputer software related to the four service areas described above.

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INDICES

Project Director

Sponsoring Office in the Department of Education

next page blank

305

306-Blank

# PROJECT DIRECTOR INDEX

A
Aho, Carolyn, 107
Allen, Judith Edwards, 243
Anderson, Charles M., 52
Appell, Louise, 137
Ascik, Tom, 218
Ashley, William, 252
Archer, Philip, 230

B
Bacus, Bruce, 94
Barnes, Everett, 204
Barresi, Josephine, 157
Beck, Isabel, 76
Becker, Henry Jay, 216
Behr, George, 201
Bell, Sanders, 181, 284
Bellucci, Joseph, 26
Bennett, Winnie L., 56
Berenberg, William, 38
Birkenholz, Jane, 232
Bishop, W. Warren, 191
Black, Robert S., 154
Blakely, Hank, 174
Blum, Robert E., 202
Bork, Alfred, 130
Boyd, Joann G., 61
Brandt, Gary, 49
Bridwell, Lillian, 98, 286
Brooks, Mindy, 29
Brown, Judy, 277
Brown, Paul L., 28
Browning, Philip, 175
Brownlee-Conyers, Jean, 286
Bruce, Bertram, 81
Budoff, Milton, 254
Bunderson, C. Victor, 147
Burgos, Gaddiel Morales, 58
Burstein, Leigh, 198
Bush, Corlann G., 19

C
Camp, John S., 103
Campbell, Bobbi, 40
Campbell, Melanie, 68
Cardona, Jesus, 55
Carpenter, Thomas, 258
Cassedy, Ellen, 20
Cazden, Courtney, 224
Chambers, Jay, 203
Champagne, Audrey, 126
Chapman, Robin S., 257
Chase, Shirley, 12, 239, 248
Chavez, Chris, 84

Clark, Barbara, 87
Clark, D. Joseph, 132
Cochrane, Harold C., 139
Cole, John C. Jr., 160
Cooley, William W., 197
Cortez, Marion, 102
Coughran, Consuelo, 122
Crumb, Glen H., 52
Culcasure, David F., 95, 163, 164

D
Damarin, Suzanne, 105
Davis, Carl Stephen, 125
DeRose, Thomas, 75
DeTalvo, Jack, 111, 276
Dickson, W. Patrick, 77, 226
Doughty, Gavin, 30
Duong, Nga, 135

E
Eicholz, Robert L., 129
Elting, Susan, 170
Ely, Donald P., 226
Engle, Willa, 71
Erickson, John, 278
Espinosa, Rosemarie Z., 11

F
Fivel, Daniel I., 129
Flowers, Susan, 272
Foster, June, 123
Foulds, Richard, 39
Fox, Jim, 221
Freston, C.W., 192

G
Galloway, James, 168
Garcia, Eleanor, 91
Gates, Dick, 67
Gelatt, James P., 158
Gerlovich, Jack, 127
Gibbon, Samuel, 118
Gibbons, William E., 79, 281
Glowinski, Debra J., 65, 183
Gonzales-Pando, Miguel, 85
Goodman, Frank, 83
Grate, John, 166
Grayson, Lawrence P., 210
Greeno, James, 260
Gross, Randy E., 108
Guffy, Norman T., 162
Gutierrez, Jose E., 106

H
Hakes, Judith A., 119
Hansen, Joe, 205
Harvey, Tessa R., 4
Hassell, Agenes, 149
Hawkins, Warren H. Jr., 27
Hazan, Paul L., 178
Health, Steve, 185
Healy, Margaret, 62
Heiselman, Carol, 63, 280
Helms, David, 189
Horace Mann Learning Center, 151
Hsu, Tse-Chi (2nd), 180
Huang, Che-tsao, 60
Hutchins, Sandra E., 37

I
Ingle, Henry, 167

J
Jackson, Gregory, 211
James, Robert, 285
Jampolsky, Arthur, 36
Jobe, John M., 116
Johnson, Diane, 8

K
Kalisch, Stan, 205
Karlovitz, Les A., 109
Kastenschmidt, Walter R., 16
Kilburn, Carolyn, 124
King, Jodie, 48
Klem, Lynn, 190
Klotz, Eugene A., 114
Kolpfer, Leopold, 126
Koontz, Marvin S., 6
Kramer, Sylvia, 9
Kraus, William H., 100
Kurland, D. Midian, 263

L
Lamos, Joseph P., 177
Langer, Victor, 22, 142
Latimer, Jane, 185
Lavin, Richard J., 53, 78, 282
Lesgold, Alan, 212, 261
Lester, William, 150
Levin, Henry, 251
Levine, John, 264
Lewin, Ann W., 152
Linn, Marcia, 262
Livermont, James, 80
Lockheed, Marlaine, 214

Loucks, Susan F., 88
Luchins, Edith H., 113, 148
Lunney, David, 34
Lynch, Dennis F., 148

M
Mace, Ronald L., 207
MacDonald, Ruth, 136
Maez, Lento, 51
Maggs, Peter, 44
Malouf, David, 194, 233, 234
Marcus, Marvin, 117
Marrs, Larry, 271
Martin C. Patrick, 169
Martin, Karen C., 18
Martin, Sharon, 249
Martinez, Herminio, 13
Martinez, Moises, 90
McAlees, Daniel C., 237
McArthur, David, 179
McCann, Richard A., 171
McCannon, Roger, 270
McConkey, David Max, 165
McLaughlin, Donald, 245, 253
McNamara M.L., 64
McNeal, Donald R., 46
Mehan, Hugh, 225
Milazzo, Patricia, 66, 199, 200, 206
Miller, Inabeth, 267
Miller, Jon F., 257
Miller, Victor, 93
Miller, Winford "Joe", 184
Mitakes, Maureen, 230
Moore, Dewitt N., 57
Morris, J. Richard, 115
Moseley, David, 131
Moser, James, 258
Moskowitz, Jay, 241
Muller, Alexandra, 222
Murray, Karl E., 155

N
Nasman, Leonard, 240
Neff, Monroe C., 97
Newman, Shelia S., 153
Nitko, Anthony J., 180
Noggle, Nelson, 205

O
Oldsen, Carl, 269
Oliver, James, 25
O'Neill, George, 141
Orr, Bonnie, 188

P
Papert, Seymour, 10
Paul, Dan, 255
Pena, Gladys, 50
Perlmutter, Marion, 222
Peters, Harold J., 133
Peterson, Richard D., 250
Petrie, James, 54
Phillipo, John, 15, 279
Phillips, David, 70
Philips, Susan, 35
Piestrup, Ann, 101
Plewe, Stanley J., 7
Powers, Walter L., 49, 89, 283
Prinz, Philip, 74
Prichard, William H., 23
Prowse, Colin W., 138

R
Raizen, Senta A., 219
Ray, William E., 99
Rees, Peter W., 143
Reif, Frederick, 212
Reisner, Elizabeth R., 217
Reith, Herbert, 193
Reith, Herbert, 231
Reith, Herbert J., 287
Rettig, Michael, 229
Reynolds, Robert, 104
Riker, Joseph T., 69
Roedell Wendy C., 121
Rollins, Richard A., 195
Rosenburg, Steven, 45
Ross, Donald, 98
Rothe, Paul H., 128
Rubin, Andee, 81
Rubin, David, 235
Rude-Parkins, Carolyn, 259
Russ-Eft, Darlene F., 245
Russel, Douglas A., 124
Russel, Susan Jo, 5

S
Saltinski, Ronald, 120
Savin, William, 268
Schneider, Joe, 173
Schnitz, Jim, 82
Schubert, Jane, G., 7
Schultz, Tom, 242
Schwartz, Jadah, 211
Seamands, Roger, 24
Semmel, Melvyn, 92, 236
Sension, Donald, 182
Shaffer, Wendy, 59

Sharpe, David M., 138
Shavelson, Richard, 227
Shelton, Dick, 144
Sherron, Ron, 187
Shively, Joe E., 256
Sirotnik, Ken, 198
Slotnick, Robert S., 72
Smith, Ann, 159
Smith, Martha L., 172
Smith, Mary Grace, 267
Spillers, David S., 46
Stacey, Nevzer, 220
Steen, Lynn Arthur, 112
Sterling, Christopher, 213
Stolurow, Lawrence M., 246
Stowitschek, Carol E., 110

T
Teeter, Phyllis, 265
Thier, Herbert, 247
Thomas, Maureen, 156
Thursh, Don, 134
Tichenor, Ellen, 21
Tinker, Robert F., 41, 244
Treichel, Janet, 238

U
Unruh, Roy, 127

V
Vanderheiden, Gregg C., 42, 47

W
Walton, Carolyn, 86
Wang, Margaret, 3
Ward, Chuck, 140
Webb, Charles, 196
Whitford, W.H., 161
Winkler, John D., 228
Woo John Jr., 43
Woolly, David, 12, 275
Wright, Douglas, 215

Z
Zacchie, David A., 88
Zuckerman, Robert A., 176
Zweken, Steward H., 31

## INDEX OF COMPUTER EDUCATION PROJECTS
## BY SPONSORING OFFICE IN THE DEPARTMENT OF EDUCATION

(The name of the Education Department Contact Person is provided for each project.)

OFFICE OF BILINGUAL EDUCATION AND MINORITY LANGUAGE AFFAIRS
Mahony, Mary T., 13, 54, 80, 84, 85
Ryan, Cindy, 48, 50, 51, 83, 86, 90, 91, 122, 135

OFFICE OF EDUCATIONAL RESEARCH AND IMPROVEMENT
Division of National Dissemination Programs
Michaelian, Katherine, 8, 12, 15, 63, 78, 87, 89, 93, 102, 104, 107, 111, 181, 182, 183, 275, 276, 277, 279, 280, 281, 282, 284

Division of Technology, Research Assessment and Development
Applewhite, Mary Ches, 14, 52
Erdman, Ann, 6, 49, 75, 118, 127, 167
Fisher, Sheldon, 53, 81, 82, 88, 105, 124, 148, 253
White, Evelyn, 147

Educational Technology and Science Staff
Esty, Edward, 244, 245, 246
Fulton, Kathleen, 212

National Center for Education Statistics
Mertins, Paul, 213, 214
Wright, Douglas, 215

National Institute of Education
Office of the Director
Carroll, Thomas, 173
Grayson, Lawrence, P., 210, 219

Program on Dissemination and Improvement of Practice
Arundel, Kevin, F., 169, 266
Bruner, Michael, 189
Coulson, John, 171
Haughey, Charles, 166
Lallmang, Richard, A., 172
Otte, Richard, 202, 243
Talley, Susan, 236

Program on Education Policy and Organization
Ascik, Tom, 218
Fox, Jim, 128, 174, 203, 221, 251
Schultz, Tom, 242
Stacey, Nevzer, 220

Program on Teaching and Learning
Butler, Patricia, A. 10, 16, 100, 101, 103, 106, 108, 109, 112, 113, 114, 115, 119, 120, 125, 211, 222, 225, 262, 263
Cahir, Stephen, 66, 199, 200, 201, 106, 224,
Cross, Mary, 77, 226, 256, 257, 258
Gold, Norman, 198

Klein, Susan, 197
Moles, Oliver, 216
Segal, Judith, 3, 76, 126, 260, 261, 264
Rudner, Lawrence, 197, 180
Taylor, John, 227
Uribe, Oscar, 223, 228
Wilkes, Joseph, A., 193

OFFICE OF ELEMENTARY AND SECONDARY EDUCATION
Compensatory Education Programs
Oates, Taunya, E., 63, 65, 78, 79, 102, 104

Migrant Education
Hogan, Patrick, 184

Office of Indian Education
Khan, Hakim, 64

Women's Educational Equity Act Program
Fiegel, John, 4, 5, 7, 9, 11, 20, 121

OFFICE OF MANAGEMENT
Horace Mann Learning Center, 151
Webb, Charles, 196

OFFICE OF PLANNING, BUDGET AND EVALUATION
Birman, Beatrice, 241
Stonehill, Robert, 204, 217

OFFICE OF POSTSECONDARY EDUCATION
Division of Institutional Development
Brayer, Howard, 131
Collins, Anne, P., 27, 58, 61, 141, 150
Fleming, Edith, P., 27
Jones, Geraldine, M., 61, 141
Kyles, Rogena, D., 26
Peo, John R., 60, 72
Pearson, Carl, S.,
Stewart, Carlos, 62
Webber, Elvin, H., 59
Westgate, Blanca, M., 58
White, Brenda, W., 195

Fund for the Improvement of Postsecondary Education
De Meester, Lynn, 21
Donahue, Jay, 31, 98, 99, 116, 138
Ehrmann, Stephen, C., 22, 23, 29, 117, 129, 130, 132, 133, 134, 139, 267
Grason, Joann, 142, 143
Hayman, Diana, 140, 268
Lynch, Felicia, 28
Rolzinski, Catherine, 19, 270

Program Operations Branch
Potts, Paula, M., 25, 285
Pretzer, Donald, H., 57, 149
Retzlaff, Bernice, 24, 30

OFFICE OF SPECIAL EDUCATION AND REHABILITATIVE SERVICES

National Institute of Handicapped Research
Cromar, Emily, 46
Fitzgerald, Inez, 272
Johnson, Richard, 36, 39, 47
Liberti, Ellen, J., 271
Melia, Richard, P., 237
Reed, L. Deno, 37
Traub, Joseph, E. 38, 43, 207

Special Education Programs
Alleva, Anmarie, Kallas, 152, 156
Anderek, Paul, 34, 40, 41, 42, 44, 176, 177, 178
Cargile, Doris, L. 110, 153, 168
Hamilton, James, L., 34, 45, 73, 74, 92, 94, 175, 229, 230, 231, 232, 233, 234, 235, 236, 247, 254, 259, 265
Hauser, Jane, 123, 136, 137, 165, 170
Mueller, Max, 154, 192
Siantz, James, 157
Sutherland, Doris, 158, 159
Ware, Victoria, 155, 194, 287

OFFICE OF VOCATIONAL AND ADULT EDUCATION
Division of Adult Education Services
Parker, Jim, 17, 18, 55, 56, 67, 68, 69, 70, 71, 95, 96, 97, 114, 144, 160, 161, 162, 163, 164, 185, 186, 187, 188, 190, 191, 249, 250, 255

Division of Innovation and Development
DiCola, Richard F., 238
Lovell, Mary, 239, 240, 248, 252, 269